Brushy Creek Municipal Utility District

SENDERO SPRINGS TRAIL AND DRAINAGE IMPROVEMENTS



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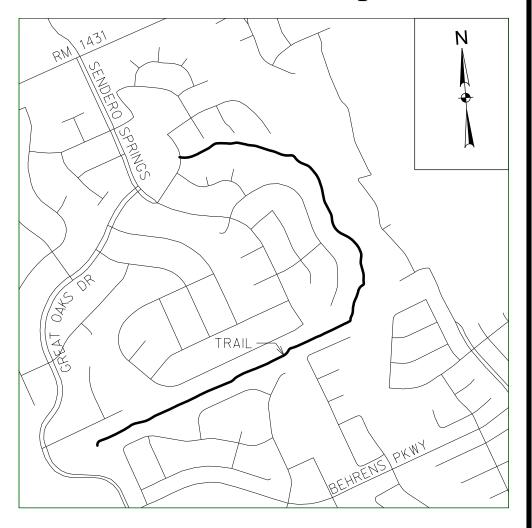
APPROVED FOR CONSTRUCTION:

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT



JULY 2016 AVO 31377

Location Map



SHEET LIST

COVER SHEET
GENERAL NOTES
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CONSTRUCTION ENTRANCES AND STAGING
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GRADING DETAILS

DRAINAGE PROFILES STORM DRAINAGE DETAIL SHEETS



100% PLANS

GENERAL NOTES:

- All construction shall be in accordance with Williamson County standards, BCMUD standards, State Law & Regulations.
- 2. Any existing utilities, pavement, curbs, sidewalks, structures, trees, trailmarkers, etc., not planned for destruction or removal that are damaged or removed shall be repaired or replaced at contractor's expense.
- The Contractor shall verify all depths and locations of existing utilities prior to any construction. Any discrepancies with the construction plans found in the field shall be brought immediately to the attention of the Engineer who shall be responsible for revising the plans as appropriate.
- The Contractor shall give the BCMUD 48 hours notice before 4. beginning each phase of construction
- All areas disturbed or exposed during construction shall be revegetated in accordance with the plans and specifications. Revegetation of all disturbed or exposed areas shall consist of sodding or seeding, at the Contractor's option unless otherwise called out in plans. However, the type of revegetation must equal or exceed the type of vegetation present before construction.
- The Contractor and the Engineer shall keep accurate records of all construction that deviates from the plans. The Engineer shall furnish BCMUD accurate "As-Built" drawings following completion of all construction. These "As-Built" drawings shall meet with the satisfaction of the Engineering and Development Services Department prior to final acceptance.
- The Brushy Creek MUD shall not be petitioned for acceptance until all necessary easement documents have been signed and recorded.
- When construction is being carried out within easements, the Contractor shall confine his work to within the permanent and any temporary easements. Prior to final acceptance, the Contractor shall be responsible for removing all trash and debris within the permanent and temporary easements. Clean-up shall be to the satisfaction of the Engineer.

 Prior to any construction, the Contractor shall apply for and secure all proper permits from the appropriate authorities.
- Available benchmarks that may be utilized for the construction of this project are described as follows:

CLIDVEY CONTROL TABLE

SURVEY CONTROL TABLE								
POINT NUMBER	NORTHING	EASTING	TYPE	ELEVATION				
1147	10168783.70	3113304.40	SET NAIL "TP"	849.05				
1148	10168944.36	3113278.50	SET NAIL "TP"	851.43				
1231	10169158.21	3113741.97	SET NAIL "TP"	828.08				
1232	10169087.58	3113904.74	SET NAIL "TP"	825.29				
1604	10169480.80	3114780.02	SET NAIL "TP"	825.84				
1605	10169562.59	3114911.68	SET NAIL "TP"	829.63				
1700	10169635.59	3115161.21	SET NAIL "TP"	825.72				
2552	10169612.28	3115555.07	SET NAIL "TP"	816.34				
1832	10169804.82	3115495.30	SET NAIL "TP"	818.34				
2673	10170215.48	3116335.74	SET NAIL "TP"	798.57				
2674	10170374.57	3116273.46	SET NAIL "TP"	801.76				
2986	10171453.72	3115994.84	SET NAIL "TP"	807.69				
2985	10171644.62	3115972.09	SET NAIL "TP"	808.10				
3773	10172153.98	3114860.06	SET NAIL "TP"	839.02				
3772	10172049.87	3114658.53	SET NAIL "TP"	850.48				

NOTE: SURVEY COORDINATES ARE STATE PLANE, NAD 83 TEXAS COORDINATE SYSTEM CENTRAL ZONE. USE AN ADJUSTMENT FACTOR OF 1.00012 TO CONVERT TO SURFACE COORDINATES.

Preparing Right-Of-Way shallbe performed adjacent to trail improvements for the approximate station ranges listed below:

NC-2

STA 1+60 to 3+25 STA 1+05 to 2+80

STA 1+60 to 2+00

SIA	3+15 +0 (+60
STA	15+30 to 18+45
STA	22+25 to 24+40
STA	25+95 to 29+60
STA	33+10 to 36+25
STA	44+60 to 44+90
STA	46+30 to 48+50
STA	49+15 to 51+30
STA	59+50 to 59+65
STA	61+05 to 62+00
	STA STA STA STA STA STA STA

TRENCH SAFETY NOTES:

- In accordance with the Laws of the State of Texas and the U.S. Occupational Safety and Health Administration regulations, all trenches over 5 feet in depth in either hard and compact or soft and unstable soil shall be sloped, shored, sheeted, braced or otherwise supported. Furthermore, all trenches less than 5 feet in depth shall also be effectively protected when hazardous ground movement may be expected. Trench safety systems to be utilized for this project will be provided by the Contractor.
- In accordance with the U.S. Occupational Safety and Health Administration regulations, when persons are in trenches 4 feet deep or more, adequate means of exit, such as a ladder or steps, must be provided and located so as to require no more than 25 feet of lateral travel.
- If trench safety system details were not provided in the plans because trenches were anticipated to be less than 5 feet in depth and during construction it is found that trenches are in fact 5 feet or more in depth or trenches less than 5 feet in depth are in an area where hazardous ground movement is expected, all construction shall cease, the trenched area shall be barricaded and the Engineer notified immediately. Construction shall not resume until appropriate trench safety system details, as designed by a professional engineer, are retained and copies submitted to the Engineer.

STREET AND DRAINAGE NOTES:

- All testing shall be done by an independent laboratory at the Owner's expense. Any retesting shall be paid for by the Contractor. Testing shall be coordinated with the Inspector and he shall be given a minimum of 24 hours notice prior to any
- testing.

 Backfill behind the curb shall be compacted to obtain a minimum of 95% maximum density to within 3" of top of curb. Material used shall be primarily granular with no rocks larger than 6" in the greatest dimension. The remaining 3" shall be clean topsoil free from all clods and suitable for sustaining plant life.
- All R.C.P. shall be minimum class III. All PVC shall be SDR-26.

TRAFFIC MARKING NOTES:

- Any methods, street markings and signage necessary for warning motorists, warning pedestrians or diverting traffic during construction shall conform to the Texas Manual of Uniform
- Traffic Control Devices for Streets and Highways, latest edition.
 All pavement markings, markers, paint, traffic buttons, traffic controls and signs shall be installed in accordance with the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges and, the Texas Manual of Uniform Traffic Control Devices for Streets and Highways, latest editions.

EROSION AND SEDIMENTATION CONTROL NOTES:

- Erosion controlmeasures, site work and restoration work shallbe in accordance with the details.
- All slopes shall be sodded or seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they are applied.
- Silt fences, rock berms, sedimentation basins and similarly recognized techniques and materials shallbe employed during construction to prevent point source sedimentation loading of downstream facilities. Additional measures may be required if, in
- downstream tacilities. Additional measures may be required it, in the opinion of the Engineer, they are warranted. All temporary erosion control measures shall not be removed until final inspection and approval of the project by the Engineer. It shall be the responsibility of the Contractor to maintain all temporary erosion control structures and to remove each structure as approved by the Engineer.

 All mud, dirt, rocks, debris, etc., spilled, tracked or otherwise deposited on existing paved streets, drives and areas used by the public shall be cleaned up immediately.
- Restore all disturbed areas, including construction entrances and staging areas, to equal or exceed the original site condition.

SPECIAL NOTES:

- Contractor shall perform work described in these plans so as to minimize construction vehicle traffic on finished improvements and repaired sections of the trail.
- Any damaged areas of the trailoutside designated areas of improvement will be returned to satisfactory condition, as determined by BCMUD staff. When the Contractor feels that they have completed work on a section of trail such that the section of trail will no longer see traffic from construction vehicles, the Contractor will schedule a walk-through of that section of trail with BCMUD staff to determine areas to be repaired. The labor and materials required shall be paid for by the line item bid for "GRANITE GRAVEL HIKE & BIKE TRAIL (POST CONSTRUCTION TRAIL REPAIR, 2")" and the final quantity will be calculated and agreed upon by both the Contractor and Owner.
- Where construction vehicles must drive or operate over the criticalroot zones of trees, plywood shall be laid in vehicle path in addition to mulch required by details. Cost of plywood will be subsidiary to tree protection measures.
- Erosion controllog shall be subsidiary to the line item payment for silt fence.
- Contractor to verify and designate boundaries of private property prior to construction. No work shall be performed on private property without easements. Contractor shall immediately notify the engineer of any conflict between property lines and proposed work.

SEQUENCE OF CONSTRUCTION:

- Installall tree protection fence, silt fence, rock berms, construction entrances, construction fence, and spoils areas in accordance with the erosion controlplans.
- Establish trail and neighborhood connection centerlines.
- Construct proposed trallimprovements.
 Establish hydromulch seeding for all disturbed areas.
 Repair trail as stated in Special Note 1 above.
- Remove all temporary erosion control devices.



SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS

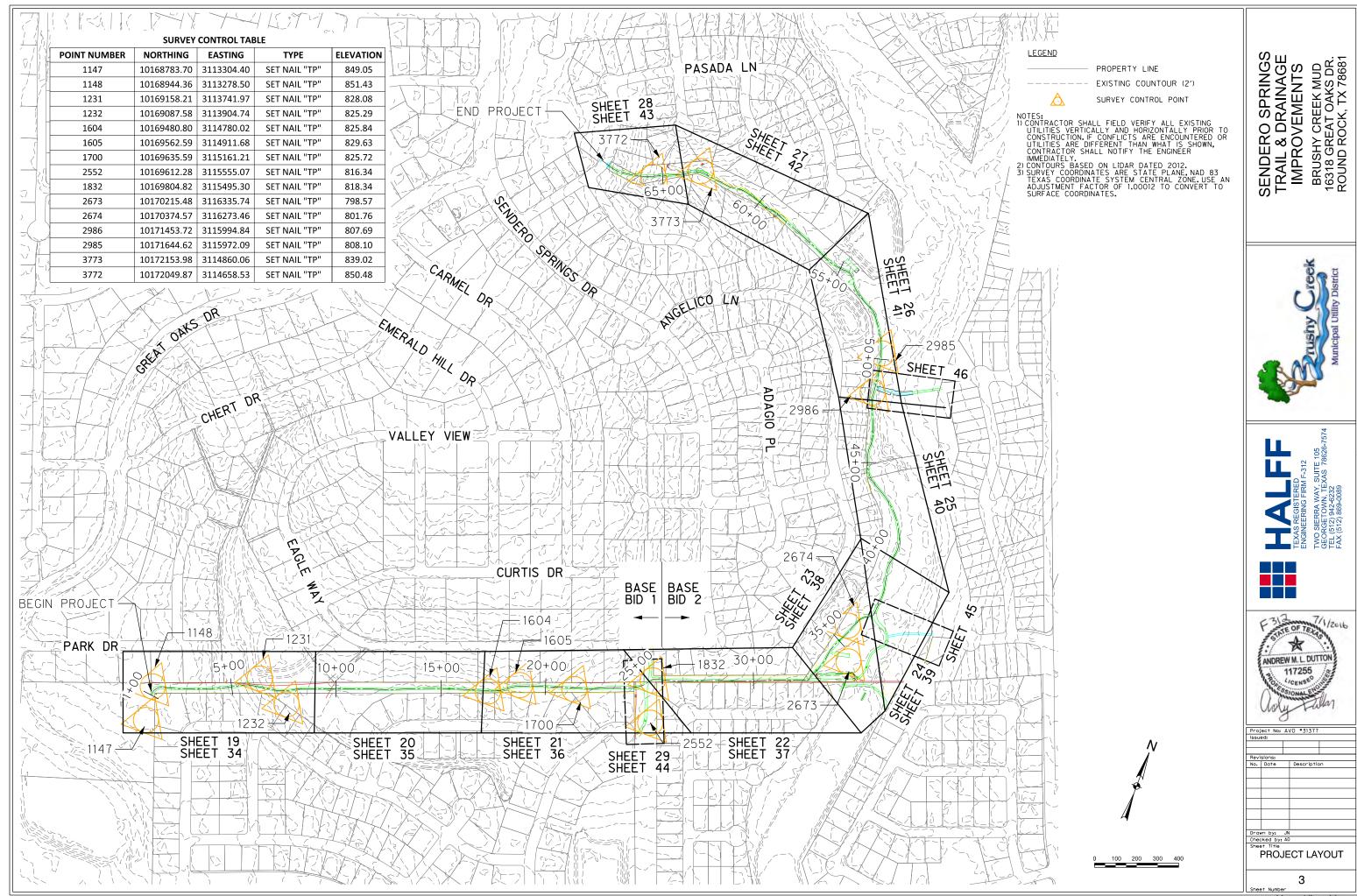
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BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681





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Revi	sions:			
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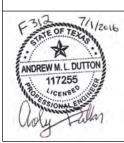
Curve Data Curve TRAILCL-19
P.I. Station 32+85.20 N 10,170,090.5292 E 3,116,190.9364
Delta = 40° 15′ 19.41″ (RT)
Degree = 223° 18′ 52.42″
Tangent = 9.4032
Length = 18.0263
Radius = 25.6570
External = 1.6688
Long Chord = 17.6578
Mid. Ord. = 1.5669
P.C. Station 32+75.79 N 10,170,081.2253 E 3,116,192.2988
P.T. Station 32+93.82 N 10,170,098.5101 E 3,116,195.9089
C.C. Back = N 8° 19′ 50.05″ W
Ahead = N 31° 55′ 29.36″ E
Chord Bear = N 11° 47′ 49.65″ E Curve TRAILCL-13
P.I. Station
24+58.45 N
10,169,755,2230 E
3,115,458.7105
Delta = 39° 30' 07.75" (LT)
Degree = 45° 33' 37.03"
Tangent = 86.7030
Radius = 125.7582
External = 7.8609
Long Chord = 84.9960
Mid. Ord = 7.9869
P.C. Station
P.T. Station
P.T. Station
C.C.
N
10,169,739.1696 E
3,115,416.5061
Sack = N 69° 10' 28.07" E
Ahead = N 29° 40' 20.31" E
Chord Bear = N 49° 25' 24.19" E Curve TRAILCL-13 P.I. Station 2 Delta = 39° 30 Curve Data Curve TRAILCL-20
P.I. Station 33+48.72 N 10,170,145.1083 E 3,116,224,9417
Delta = 25° 51' 41.68" (LT)
Degree = 23' 57' 37',48'
Tangent = 54.9026
Length = 107.9346
Radius = 239.1269
External = 6.2218
Long Chord = 107.0207
Mid. Ord. = 6.0640
32+93.82 N 10,170,098.5101 E 3,116,195.908' External = 6.2218
Long Chord = 107.0207
Mid. Ord. = 6.0640
P.C. Station 32+93.82 N 10,170,098.5101 E 3,116,195.9089
P.T. Station 34+01.75 N 10,170,199.7038 E 3,116,230.7409
C.C. N 10,170,224.9619 E 3,115,992.9517
Back = N 31° 55′ 29.36″ E
Ahead = N 6° 03' 47.68″ E
Chord Bear = N 18° 59′ 38.52″ E Curve Data Curve TRAILCL-15
P.I. Station
Delta = 10° 08° 35.06" (LT)
Degree = 9° 14′ 45.29"
Tangent = 54.9953
Length = 109.7033
Radius = 619.6876
External = 2.4355
Length = 109.5601 Curve TRAILCL-21
P.I. Station 3.
Delta = 23° 04
Degree = 22° 27
Tangent = 1
Radius = 1
Radius = 2 Curve TRAILCL-21
P.I. Station
Delta = 23° 04' 28.34" (RT)
Degree = 22° 27' 06.12"
Tangent = 52.0931
Length = 102.7741
Radius = 255.1957
External = 5.2626
Long Chord = 102.0810
Mid. Ord. = 5.1563
P.C. Station 34+01.75 N 10,170,199.7038 E 3,116,230.7409
P.T. Station 34+01.75 N 10,170,199.7038 E 3,116,230.7409
P.T. Station 34+01.75 N 10,170,172.7485 E 3,116,484.5090
Back = N 6° 03' 47.68" E
Ahead = N 29° 08' 16.02" E
Chord Bear = N 17° 36' 01.85" E Course from PT TRAILCL-15 to PC TRAILCL-16 N 68° 50' 11.27" E Dist 170.0948 Curve Data Curve TRAILCL-22
P.I. Station 35+37.16 N
Delta = 7° 52' 06.86" (LT)
Degree = 12' 04' 31.76"
Tangent = 32.6321
Length = 65.1615
Radius = 474.4800 10,170,325.5087 E 3,116,277.4969 Curve TRAILCL-16
P.I. Station 28+37.44 N 10,169,916.1545 E 3,115,792.2366
Delta = 5° 24' 20.98" (RT)
Degree = 20° 44' 13.70" Tangent = 13,0438 Length = 26,0683 Radius = 276,2955 External = 0,3077 Long Chord = 26,0587 Mid. Ord. = 0,3074 P.C. Statton 28+24.39 N 10,169,911.4453 E 3,115,780.0725 P.T. Statton 28+50.46 N 10,169,919.6968 E 3,115,804.7902 C.C. N 10,169,653.7849 E 3,115,879.8238 Back = N 68° 50' 11,27" E Ahead = N 74° 14' 32,25" E Chord Bear = N 71° 32' 21 76" F Radius = 474,4800 External = 1,1208 Long Chord = 65,1103 Mid. Ord = 1,182 P.C. Station 35+04.53 N 10,170,297,0062 E 3,116,261.6080 P.T. Station 35+69.69 N 10,170,355,9181 E 3,116,289,3342 C.C. Back = N 29° 08' 16,02" E Ahead = N 21° 16' 09.17" E Chord Bear = N 25° 12' 12.59" E Course from PT TRAILCL-22 to PC TRAILCL-23 N 21° 16' 09.16" E Dist 55.1363 Curve TRAILCL-17
P.I. Station 28+79.03 N 10,169,927.4550 E 3,115,832.2846
Delta = 5° 40' 45.13" (LT)
Degree = 9° 56' 52.67'
Tangent = 28.5679
Length = 57.0891
Radius = 575,9549
External = 0.7081
Long Chord = 57.0657
Mid. Ord. = 0.7072
P.C. Station 28+50.46 N 10,169,919.6968 E 3,115,804.7902
P.T. Station 28+50.46 N 10,169,919.6968 E 3,115,858.8762
C.C. N 10,170,474.0066 E 3,115,648.3782
Back = N 74° 14' 32.25" E
Ahead = N 68° 33' 47.12" E
Chord Bear = N 71° 24' 09.69" E Curve TRAILCL-23
P.I. Statlon 36+52.41 N 10,170,433.0075 E 3,116,319.3424
Delta = 40° 10' 58.01" (RT)
Degree = 75' 58' 00.55'
Tangent = 27.5877
Length = 52.8952
Radius = 75.4221
External = 4.8871
Long Chord = 51.8178
Mid. Ord = 4.5897
36+24.83 N 10,170,407.2989 E 3,116,309.335' External =
Long Chord =
Mid. Ord. =
P.C. Station
P.T. Station Mid. Ord. = 4,5897 P.C. Station 36+24.83 N 10,170,407.2989 E 3,116,309.3350 P.T. Station 36+77.72 N 10,170,446.1915 E 3,116,343.5759 C.C. N 10,170,379.9395 E 3,116,379.6198 Back = N 21° 16' 09,17" E Ahead = N 61° 27' 07,17" E Chord Bear = N 41° 21' 38.17" E Course from PT TRAILCL-17 to PC TRAILCL-18 N 68° 33' 47.12" E Dist 348.1849 Course from PT TRAILCL-23 to PC TRAILCL-24 N 61° 27' 07.17" E Dist 23.8861 Curve TRAILCL-24
P.I. Station 37+07.82 N 10,170,460.5766 E 3,116,370.0171
Delta = 503* 17* 48.92"
Tangent = 6.2149
Length = 11,3375
Radius = 11.3841 10,170,069.4856 E 3,116,194.0178 Radius = 14,9446 External = 4,1372 Long Chord = 18,5847 Mid. Ord. = 3,2402 P.C. Station 32+75,74 N 10,170,065,1493 E 3,116,182,9738 P.T. Station 32+75,79 N 10,170,081,2253 E 3,116,192,2988 C.C. N 10,170,079,0600 E 3,116,177,5119 Ahead = N 8°19°50,05° W Chord Bear = N 30° 06' 58.54" E Radius = 11.3841 External = 1.5860 Long Chord = 10.9099 Mid. Ord. = 1.3920 P.C. Station 37+01.61 N 10,170,457.6066 E 3,116,364.5579 P.T. Station 37+12.98 N 10,170,466.7749 E 3,116,370.4711 C.C. N 10,170,467.6065 E 3,116,359.1175 Back = N 61° 27' 07.17" E Ahead = N 4° 11' 21.08" E Chord Rore - N 30° 40' 41412" E Chord Bear = N 32° 49' 14.13" E

Course from PT TRAILCL-24 to PC TRAILCL-25 N 4° 11' 21.08" E Dist 85.0292

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681







Proj	ect No:	Α١	۷O	#31	377	
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ALIGNMENT DATA

10,171,717.2596 E 3,115,939.8658

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Curve Data
    Curve TRAILCL-37
P.I. Station 53+81.43 N 10,171,892.8917 E 3,115,735.1576
Delta = 26° 40' 08.95" (RT)
Degree = 37° 49' 14.93"
Tangent = 35.9079
Length = 70,5145
Radius = 151,4927
External = 41074
        External
                                                                                                              4.1974
69.8796
  External = Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. Back = N SAhead = N S
  Long Chord = 69.8796

Mid. Ord. = 4.0843

P.C. Station 53+45.53 N 10,171,872.2106 E 3,115,764.5118

P.T. Station 54+16.04 N 10,171,924.5479 E 3,115,718.2087

C.C. N 10,171,996.0537 E 3,115,851.7639

Back = N 54° 50° 01.94" W

Ahead = N 28° 09° 52.99" W

Chord Bear = N 41° 29' 57.46" W
                                                                                                              Curve Data
    Curve TRAILCL-38
P.I. Station 5
Delta = 62° 3
Degree = 106°
Tangent =
                                                                        .CL-38
54+48.81 N
62° 37' 08.15" (LT)
106° 20' 03.18"
32.7734
58.8888
53.8827
                                                                                                                                                                             10,171,953.4408 E 3,115,702.7394
    Degree
Tangent
Length
Radius
                                   us = 53.8827
mal = 9.1843
Chord = 56.0014
7rd. = 7.8468
Station 54+16.04 N 10,171,924.5479 E 3,115,718.2087
Station 54+74.93 N 10,171,952.9925 E 3,115,669.9691
N 10,171,899.1148 E 3,115,670.7060
= N 28° 09' 52.99" W 1 = 8.89° 12' F8.86° W
  Radius =
External =
Long Chord =
Mid. Ord. =
P.C. Station
P.T. Station
C.C.
Back = N 2
    Ahead = S 89° 12' 58.86" W
Chord Bear = N 59° 28' 27.07" W
Curve TRAILCL-39
P.I. Station 55+36.32 N 10,171,952.1530 E 3,115,608.5879
Delta = 26° 36' 23.82" (RT)
Degree = 22° 04' 09.34"
Tangent = 61.3869
Length = 120.5596
Radius = 259.6180
External = 7.1588
Long Chord = 119.4793
Mid. Ord = 6.9667
P.C. Station 54+74.93 N 10,171,952.9925 E 3,115,669.9691
P.T. Station 55+95.49 N 10,171,978.8926 E 3,115,553,3308
C.C. N 10,172,212.5863 E 3,115,666.4183
Back = S 89° 12' 58.86" W
Ahead = N 64° 10' 37.32" W
Chord Bear = N 77° 28' 49.23" W
                                                                                                               Curve Data
 Curve TRAILCL-40
P.I. Station 5
Delta = 5° 12
Degree = 3° 1
                                                                                                      56+70.42 N 10,172,011.5299 E 3,115,485.8862
      P.I. Station
Delta =
Degree =
Tangent =
Length =
Radius =
External =
                                                                                5" 12" 04.84" (L
3" 28" 24.08"
74.9264
149.7499
1,649.5806
1,7008
149.6985
  External = 1.7008
Long Chord = 149.6985
Mid. Ord. = 1.6990
P.C. Station 55+95.49 N 10,171,978.8926 E 3,115,553.3308
P.T. Station 57+45.24 N 10,172,037.9186 E 3,115,415.7606
C.C. N 10,170,494.0321 E 3,114,834.7868
Back = N 64° 10' 37.32" W
Ahead = N 69° 22' 42.16" W
Chord Bear = N 66° 46' 39.74" W
                                                                                                              Curve Data
  Curve TRAILCL-41
P.I. Station 5
Delta = 0° 53
Degree = 0° 3
Tangent =
Length = 1
Radius = 10
                                                                           CL-41 58+25.15 N 10,172,066.0615 E 3,115,340.9735 0° 53' 26.62" (LT) 0° 33' 26.51" 79,9070 159,8109 10,279,7956 0.3106
External = 0.3106

Long Chord = 159.8093

Mid. Ord. = 0.3106

P.C. Station 57+45.24 N 10,172,037.9186 E 3,115,415.7606

P.T. Station 59+05.05 N 10,172,093.0383 E 3,115,265.7579

C.C. N 10,162,416.7636 E 3,111,795.2693

Ahead = N 70° 16' 08.78' W

Chord Bear = N 69° 49' 25.47'' W
  Curve TRAILCL-42
P.I. Station 59+21.17 N 10,172,098.4795 E 3,115,250.5870
Delta = 19° 17" 15.27" (CT)
Degree = 60° 24' 25.76 (CT)
Tangent = 16.1171
Length = 31.9293
Radius = 94.8493
External = 1.3596
                                      h = 31,9293

s = 94,8493

nal = 1,3596

Chord = 31,7787

ord = 1,3404

Station 59+05.05 N 10,172,093.0383 E 3,115,265,7579

Station 59+36.98 N 10,172,098.6042 E 3,115,234.4704

N 10,172,003.7577 E 3,115,233.7365

= N 70° 16' 08.78" U 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 1,000 
    External =
Long Chord =
Mid. Ord. =
P.C. Station
P.T. Station
C.C.
Back = N 7
      Chord Bear = N 79° 54' 46.41" W
Curve TRAILCL-43
P.I. Station 59+60.10 N 10,172,098.7831 E 3,115,211.3516
Delta = 24° 29' 05.54" (RT)
Degree = 53° 46' 25.89"
Tangent = 23.1194
Length = 45.5330
Radfus = 106.5495
External = 2.4794
Long Chord = 45.1874
Mid. Ord. = 2.4230
P.C. Station 59+36.98 N 10,172,098.6042 E 3,115,234.4704
P.T. Station 59+82.51 N 10,172,108.5275 E 3,115,190.3861
C.C. N 10,172,205.1505 E 3,115,235.2948
Back = N 89° 33' 24.05" W
Ahead = N 65° 04' 18.51" W
Chord Bear = N 77° 18' 51.28" W
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Curve Data
 Curve TRAILCL-44
P.I. Station
Delta = 9° 21° 52.05° (LT)
Degree = 32° 24° 54° 54.28°
Tangent = 14.4028
Length = 28.7414
Radius = 175.8524
External = 0.5888
Long Chord = 28.7094
Mid. Ord. = 0.8669
P.C. Station 59+82.51 N 10,172,108.5275 E 3,115,190.3861
P.T. Station 60+11.25 N 10,172,118.4625 E 3,115,163.4504
C.C. N 10,171,949.0581 E 3,115,116.2674
Anead = N 74° 26° 10.55° W
Chord Bear = N 69° 45′ 14.53° W
        Course from PT TRAILCL-44 to PC TRAILCL-45 N 74° 26' 10.55" W Dist 55.1773
Curve TRAILCL-45
P.I. Station 61+00.91 N 10,172,142.5169 E 3,115,077.0861
Delta = 26° 23' 55.74" (LT)
Degree = 38° 58' 47.04"
Tangent = 34.4743
Length = 67.7245
Radfus = 146.9886
External = 3.9886
Long Chord = 67.1270
Mid. Ord. = 3.8833
P.C. Station 60+66.43 N 10,172,133.2671 E 3,115,110.2963
P.T. Station 60+66.43 N 10,172,136.0363 E 3,115,043.2264
C.C. N 10,171,991.6682 E 3,115,070.8577
Back = N 74° 26' 10.55" W
Ahead = S 79° 09' 53.71" W
Chord Bear = N 87° 38' 08.42" W
                                                                                                                                       Curve Data
 Curve TRAILCL-46
P.I. Station 61+56.52 N 10,172,131.8326 E 3,115,021.2628
Delta = 17° 54′ 36.23" (RT)
Degree = 40° 22′ 28.38"
Tangent = 22.3623
Length = 44.3598
Radius = 141.9106
External = 1.7511
Long Chord = 44.1794
Mid. Ord. = 1.7298
P.C. Station 61+34.16 N 10,172,136.0363 E 3,115,043.2264
P.T. Station 61+78.52 N 10,172,134.5869 E 3,114,999,0708
C.C. N 10,172,275.4170 E 3,115,016.5497
Back = S 79° 09′ 53.71" W
Ahead = N 82° 55′ 30.07" W
Chord Bear = S 88° 07′ 11.82" W
        Course from PT TRAILCL-46 to PC TRAILCL-47 N 82° 55' 30.07" W Dist 113.1832
 Curve TRAILCL-47
P.I. Station 63+37.04 N 10,172,154.1120 E 3,114,841.7542
Delta = 47° 16° 05.09" (LT)
Degree = 55° 17' 53.52"
Tangent = 45.3405
Length = 85.4785
Radius = 103.6124
External = 9.4862
Long Chord = 8.6905
P.C. Station 62+91.70 N 10,172,148.5275 E 3,114,886.7494
P.T. Station 63+77.18 N 10.172,124.8508 E 3,114,807.1198
C.C. N 10,172,045.7041 E 3,114,873.9877
Back = N 82° 55' 30.07" W
Ahead = S 49° 48' 24.84" W
Chord Bear = S 73° 26' 27.39" W
         Chord Bear = S 73° 26' 27.39" W
 Curve TRAILCL-48
P.J. Station 63+95.00 N 10,172,113.3507 E 3,114,793.5079
Delta = 16° 11' 20.77" (RT)
Degree = 45° 43' 47.45"
Tangent = 17.8195
Length = 35.4016
Radius = 125.2919
External = 1.2608
Long Chord = 35.2840
Mid. Ord. = 1.2483
P.C. Station 63+77.18 N 10,172,124.8508 E 3,114,807.1198
P.T. Station 64+12.58 N 10,172,106.1017 E 3,114,777.2295
C.C. N 10,172,220.5580 E 3,114,726.2607
Back = S 49° 48' 24.84" W
Ahead = S 65° 59' 45.61" W
Chord for To Table College (College College Colleg
         Course from PT TRAILCL-48 to PC TRAILCL-49 S 65° 59' 45.61" W Dist 133.1887
 Curve TRAILCL-49
P.I. Station
Delta = 23" 19" 37.55" (RT)
Degree = 13" 49" 48.54"
Tangent = 85.5183
Length = 186.6674
Radius = 414.2792
External = 87.345
Long Chord = 167.5049
Mid. Ord. = 8.5542
P.C. Station 65" 45.77 N 10.172.051.9205 E 3.114.655.5593
P.T. Station 67" 14.44 N 10.172.016.1214 E 3.114.491.9246
C.C. N 10.172.430.3717 E 3.114.487.0304
Ahead = S 89" 19" 23.16" W
Chord Bear = S 77" 39" 34.38" W
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SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS HY CREEK MUD SREAT OAKS DR. ROCK, TX 78681 BRUSHY (16318 GRE ROUND RC







Proj	ect No:	A١	VO #31377	
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No.	Date		Description	n
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Chec	cked by:	ΑC)	
Shee	et Title			
	HC	ϽF	RIZONT	ΑL

ALIGNMENT DATA 5

Curve TRAILCL-50 P.I. Station Delta = 17° 0 Degree = 50° Tangent = 67+31.28 N 10,172,015.9224 E 3,114,475.0828 17° 00' 11.91" (RT) 50° 50' 58.98" 16.8430 Delta = 17° 00' 11.91" (RT) Degree = 50° 50' 58.98' Tangent = 16.8430 Length = 33.4384 Radius = 112.6767 External = 1.2519 Long Chord = 33.3158 Mid. Ord. = 1.2381 P.C. Station 67+41.44 N P.T. Station 67+47.87 N C.C. N 10.172 Back = S 89° 19' 23.16" W Ahead = N 73° 40' 24.94" W Chord Bear = N 82° 10' 30.89" W ent = 16.8430 th = 33.4384 us = 112.6767 chord = 1.2519 Chord = 33.3158 Ord = 1.2381 Station 67+14.44 N 10,172,016.1214 E 3,114,491.9246 Station 67+47.87 N 10,172,020.6571 E 3,114,495.9191 N 10,172,128.7902 E 3,114,490.5935 = 8,89*19*23.16" W Course from PT TRAILCL-50 to CL3 N 73° 40' 24.93" W Dist 69.0612 Point CL3 N 10,172,040.0708 E 3,114,392.6426 Sta 68+16.93 **NEIGHBORHOOD CONNECTION 1** Beginning chain NC-1 description Point NCONE001 N 10,169,539.3705 E 3,115,512.9735 Sta 1+00.00 Course from NCONE001 to PC NC-1-1 N 27° 04' 33.66" E Dist 13.5585 Curve NC-1-1 P.I. Station Delta = 32° 14' 44.65" (LT) Degree = 57° 17' 44.81" Tangent = 28.9068 Length = 56.2794 Radius = 100.0000 External = 4.0942 I ong Chord = 55.5396 3.9332 1+42.47 N 10,169,577.1817 E 3,115,532.3025 External = 4.0942 Long Chord = 55.5396 Mid. Ord. = 3.9332 P.C. Station 1+13.56 N 10,169,551.4430 E 3,115,519.1449 P.T. Station 1+69.84 N 10,169,605.9708 E 3,115,529.6978 C.C. N 10,169,596.9602 E 3,115,430.1046 Back = N 27° 04' 33.66" E Ahead = N 5° 10' 10.99" W Chord Bear = N 10° 57' 11.33" E Course from PT NC-1-1 to PC NC-1-2 N 5° 10' 10.99" W Dist 9.3128 Curve NC-1-2 P.I. Station Delta = Degree = Tangent = 1+92.96 N 10,169,628.9985 E 3,115,527.6144 15° 43' 27.53" (LT) 57° 17' 44.81" 13.8088 Delta = 1: Degree = Tangent = Length = Radius = External = Long Chord = Mid. Ord. = P.C. Station P.T. Station C.C. Back = N Ahead = N 20° 53' 38.52" W Chord Bear = N 13° 01' 54.76" W Course from PT NC-1-2 to PC NC-1-3 N 20° 53' 38.52" W Dist 94.7563 Curve NC-1-3 P.I. Station Delta = Degree = Tangent = Length = Radius = Externel 3+08.40 N 10,169,737.0068 E 3,115,486.3829 3+08.40 N 1 8° 03' 36.91" (LT) 57° 17' 44.81" 7.0455 14.0678 100.0000 0.2479 = 14.0562 Radius = 100.0000 External = 0.2479 Long Chord = 14.0562 Mid. Ord. = 0.2473 P.C. Station 3+01.35 N 10.169,730.4246 E 3,115,488.8956 P.T. Station 3+15.42 N 10.169,743.1717 E 3,115,482.9721 C.C. N 10.169,694.7605 E 3,115,395.4715 Back = N 20° 53' 38.52" W Ahead = N 28° 57' 15.43" W Chord Reg = N 26' 55' 26 98" W Chord Bear = N 24° 55' 26.98" W Curve Data Curve NC-1-4 P.I. Station 3+30.81 N 10,169,756.6363 E 3,115,475.5226 Delta = 34° 12' 45.51" (RT) Degree = 114° 35' 29.63" Tangent = 15.3880 Length = 29.8562 Radius = 50.0000 External = 2.3144 Length = 20.44166 External = 2.3144 Long Chord = 29.4146 Mid. Ord. = 2.2120 P.C. Station 3+15.42 N 10,169,743.1717 E 3,115,482.9721 P.T. Station 3+45.28 N 10,169,771,9596 E 3,115,476.9328 C.C. N 10,169,767.3773 E 3,115,526.7224 Ahead = N 5° 57' 15.43" W Ahead = N 5° 15' 30.08" E Chord Bear = N 11° 50' 52.68" W Course from PT NC-1-4 to PC NC-1-5 N 5° 15' 30.08" E Dist 32.2261

TRAIL CENTERLINE (CONT.)

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Curve Data

Curve NC-1-5
P.I. Station 3+89.36 N 10,169,815.8617 E 3,115,480.9733
Delta = 26° 41' 28.50" (LT)
Degree = 114° 35' 29.61"
Tangent = 11.8615
Length = 23.2925
Radius = 50.0000
External = 1.3877
Long Chord = 23.0825
Mid. Ord. = 1.3502
P.C. Station 3+77.50 N 10,169,804.0500 E 3,115,479.8862
P.T. Station 3+77.50 N 10,169,826.9029 E 3,115,476.6390
C.C. N 10,169,808.6324 E 3,115,430.0967
Back = N 5° 15' 30.08" E
Ahead = N 21° 25' 58.42" W
Chord Bear = N 8° 05' 14.17" W
   Course from PT NC-1-5 to PC NC-1-6 N 21° 25' 58.42" W Dist 28.1977
       Curve NC-1-6
P.I. Station
Delta = Degree = Tangent = Length = External = Length = External = Length = 
                                                      0.2452
19.7875
     Course from PT NC-1-6 to NCONE002 N 27° 06' 14.07" W Dist 51.4125
        Point NCONE002 N 10,169,916.9560 E 3,115,434.7785 Sta 5+00.20
     NEIGHBORHOOD CONNECTION 2
        Beginning chain NC-2 description
     Curve NC-2-1
P.I. Station
Delta = 65° 59' 05.99" (LT)
Degree = 127° 19' 26.24"
Tangent = 29.2150
Length = 51.8245
Radius = 45.0000
External = 8.6518
Lang Chert = 49.0076
                                                                         1+29.21 N 10,170,458.2412 E 3,116,369.8461
External = 8.6518
Long Chord = 49.0076
Mid. Ord. = 7.25666
P.C. Station 1+00.00 N 10,170,487,3781 E 3,116,371,9802
P.T. Station 1+51.82 N 10,170,444,4338 E 3,116,395,5923
C.C. N 10,170,484.0909 E 3,116,416.8600
Back = S 4° 11' 21.08" W
Ahead = S 61° 47' 44.91" E
Chord Bear = S 28° 48' 11.91" E
       Course from PT NC-2-1 to PC NC-2-2 S 61° 47' 44.91" E Dist 50.4098
    External = 1.4436

Long Chord = 29.0133

Mid. Ord. = 1.4163

P.C. Station 2+02.23 N 10,170,420.6094 E 3,116,440.0169

P.T. Station 2+31.43 N 10,170,412.1017 E 3,116,467.7548

C.C. N 10,170,486.7045 E 3,116,475.4630

Back = S 61° 47' 44.91" E

Ahead = S 84° 06' 03.21" E

Chord Bear = S 72° 56' 54.06" E
       Course from PT NC-2-2 to PC NC-2-3 S 84° 06' 03.21" E Dist 20.0378
    Curve NC-2-3
P.I. Station
Delta = 35° 23' 05.16" (LT)
Degree = 190° 59' 09.35"
Tangent = 9.5698
Length = 18.5274
Radius = 30.0000
External = 1.4894
Long Chord = 18.2344
    Length = 18.5274
Radius = 30.0000
External = 1.4894
Long Chord = 18.2344
Mid. Ord. = 1.4189
P.C. Station 2+51.47 N 10,170,410.0423 E 3,116,487.6865
P.T. Station 2+70.00 N 10,170,413.7690 E 3,116,505.5359
C.C. N 10,170,439.8834 E 3,116,490.7698
Back = S 84° 06° 03.21" E
Ahead = N 60° 30.51.63" E
Chord Rap = N 78° 12° 24° 21" F
       Chord Bear = N 78° 12' 24 21" F
     Course from PT NC-2-3 to PC NC-2-4 N 60° 30' 51.64" E Dist 24.6420
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Curve Data
Curve NC-2-4
P.I. Station 3+23.02 N 10,170,439.8661 E 3,116,551.6893
Delta = 13° 03' 42.89" (RT)
Degree = 23° 06' 49.63°
Tangent = 28.3787
Length = 56.5114
Radius = 247.8857
External = 1.6192
Long Chord = 56.3891
Mid. Ord. = 1.6086
P.C. Station 2+94.64 N 10,170,447.8899 E 3,116,526.9863
P.T. Station 3+51.15 N 10,170,447.8899 E 3,116,578.9101
C.C. N 10,170,210.1186 E 3,116,648.9971
Back = N 60° 30' 51.63" E
Ahead = N 73° 34' 34.53" E
Chord Bear = N 67° 02' 43.08" E
 Curve NC-2-4
 Chord Bear = N 67° 02' 43.08" E
 Course from PT NC-2-4 to NC201 N 73° 34' 34.52" E Dist 95.6346
 Point NC201 N 10,170,474.9295 E 3,116,670.6425 Sta 4+46.78
  ______
 NEIGHBORHOOD CONNECTION 3
 Beginning chain NC-3 description
                 Point NC300 N 10,171,478.8646 E 3,115,997.4925 Sta 1+00.00
 Course from NC300 to PC NC-3-1 N 87° 26' 59.69" E Dist 32.2681
 Curve NC-3-1
P.I. Station
Delta =
Degree =
Tangent =
Length =
Radius =
External =
Long Chard
                     -1 1+46.49 N 10,171,480.9331 E 3,116,043.9382 8 08'.09.14" (LT) 28° 38' 52.40" = 14.2237 28.3996 200,0000 0.5051 = 28.3757 0.5039 10.171,480.9033 E 2,116,020,7286
External = 0.5051

Long Chord = 28.3757

Mid. Ord. = 0.5039

P.C. Station 1+32.27 N 10,171,480.3003 E 3,116,029.7286

P.T. Station 1+60.67 N 10,171,483.5706 E 3,116,029.7286

C.C. N 10,171,680.1022 E 3,116,020.8301

Back = N 87° 26' 59.69" E

Ahead = N 79° 18' 50.55" E

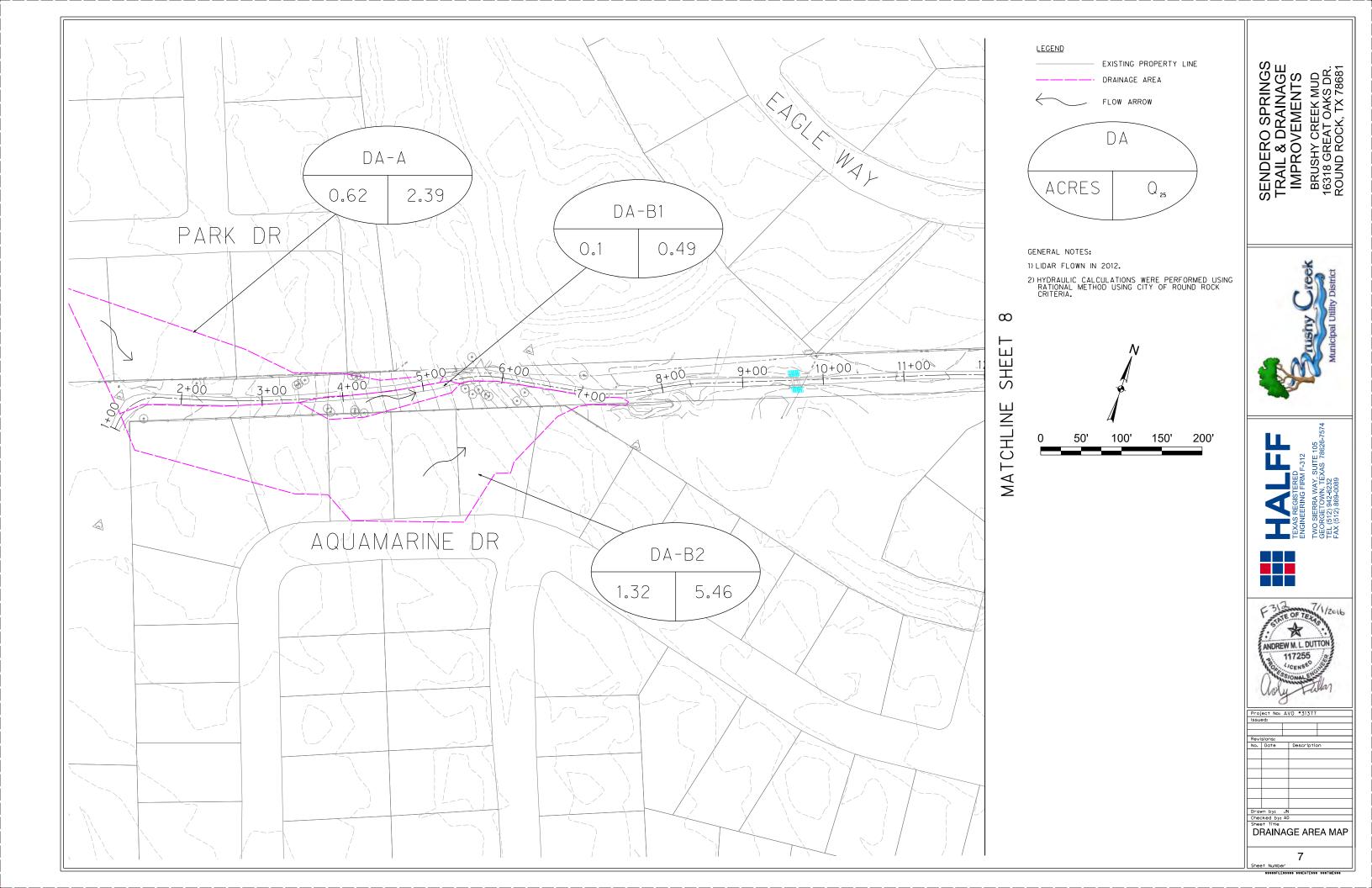
Chord Bear = N 83° 22' 55.12" E
 Course from PT NC-3-1 to PC NC-3-2 N 79° 18' 50.55" E Dist 47.2401
Curve NC-3-2
P.I. Station
Delta = 18° 02' 24.59" (LT)
Degree = 28° 38' 52.40"
Tangent = 31.7487
Length = 62.9721
Radius = 200.0000
External = 2.5043
Mid. Ord. = 2.4733
P.C. Station 2+70.88 N 10.171,513.4763 E 3,116,104.3361
P.T. Station 2+70.88 N 10.171,513.4763 E 3,116,104.3361
P.T. Station 2+70.88 N 10.171,513.4763 E 3,116,1067.2510
Back = N 79° 18' 50.55" E
Ahead = N 79° 18' 50.55" E
Chord Bear = N 70° 17' 38.25" E
 Chord Bear = N 70° 17' 38.25" E
 Course from PT NC-3-2 to NC301 N 61° 16' 25.96" E Dist 154.0653
 Point NC301 N 10,171,587.5237 E 3,116,298.4797 Sta 4+24.95
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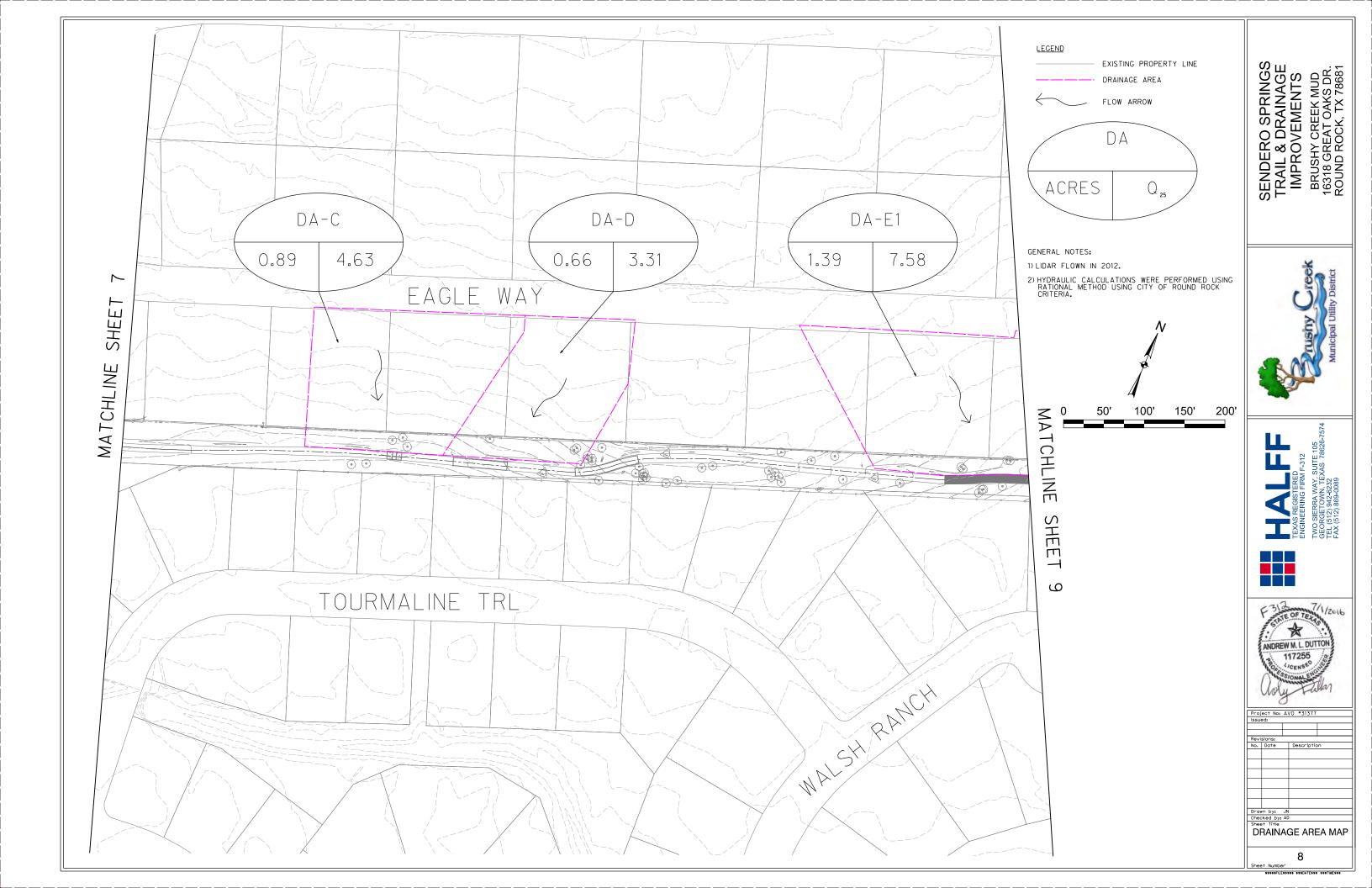
/AY, SUITE 105 , TEXAS 78626-7 232 7/1/2016 F312 7/ * ANDREW M. L. DUTTON 117255 Project No: AVO #31377

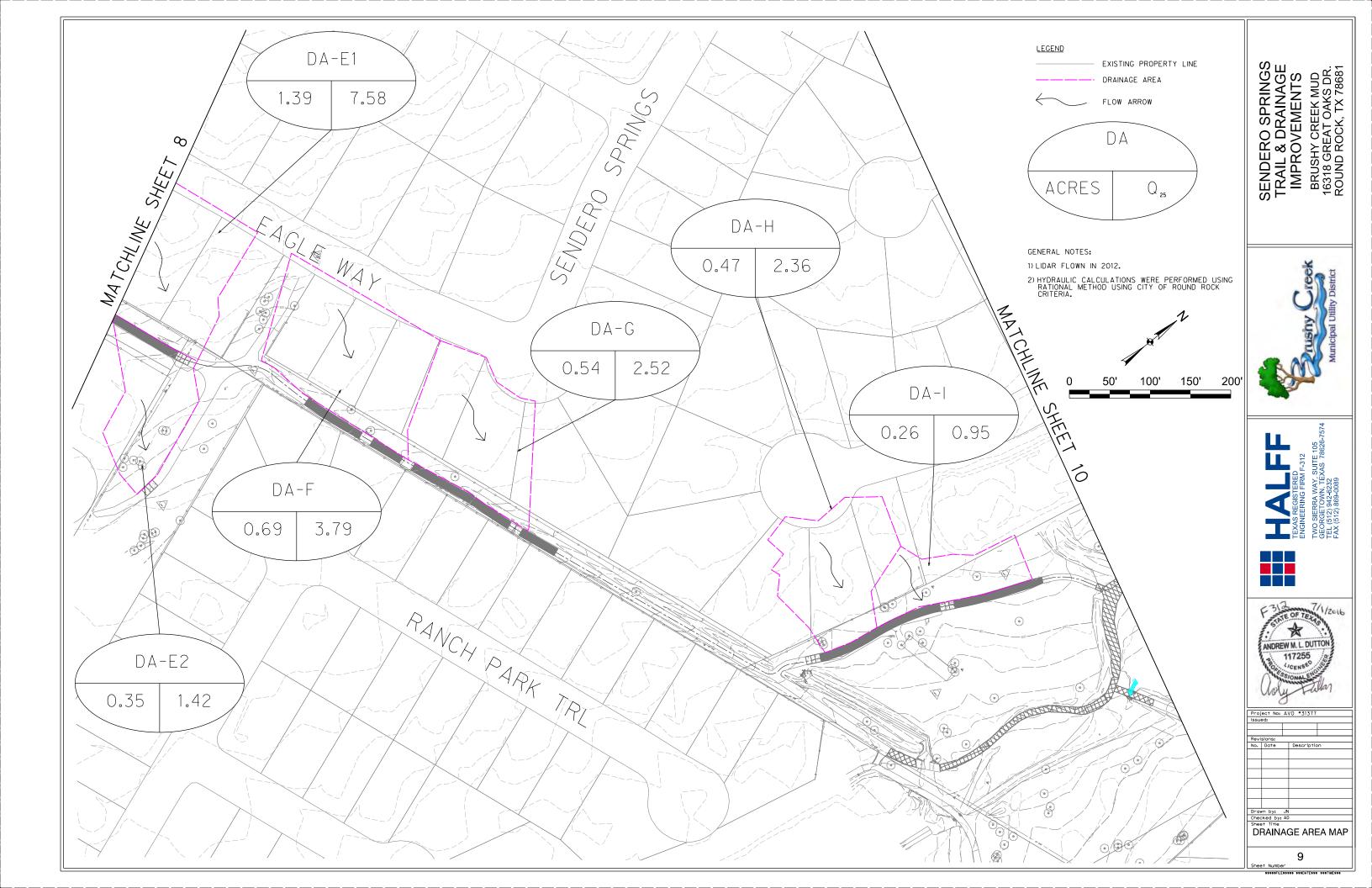
SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681

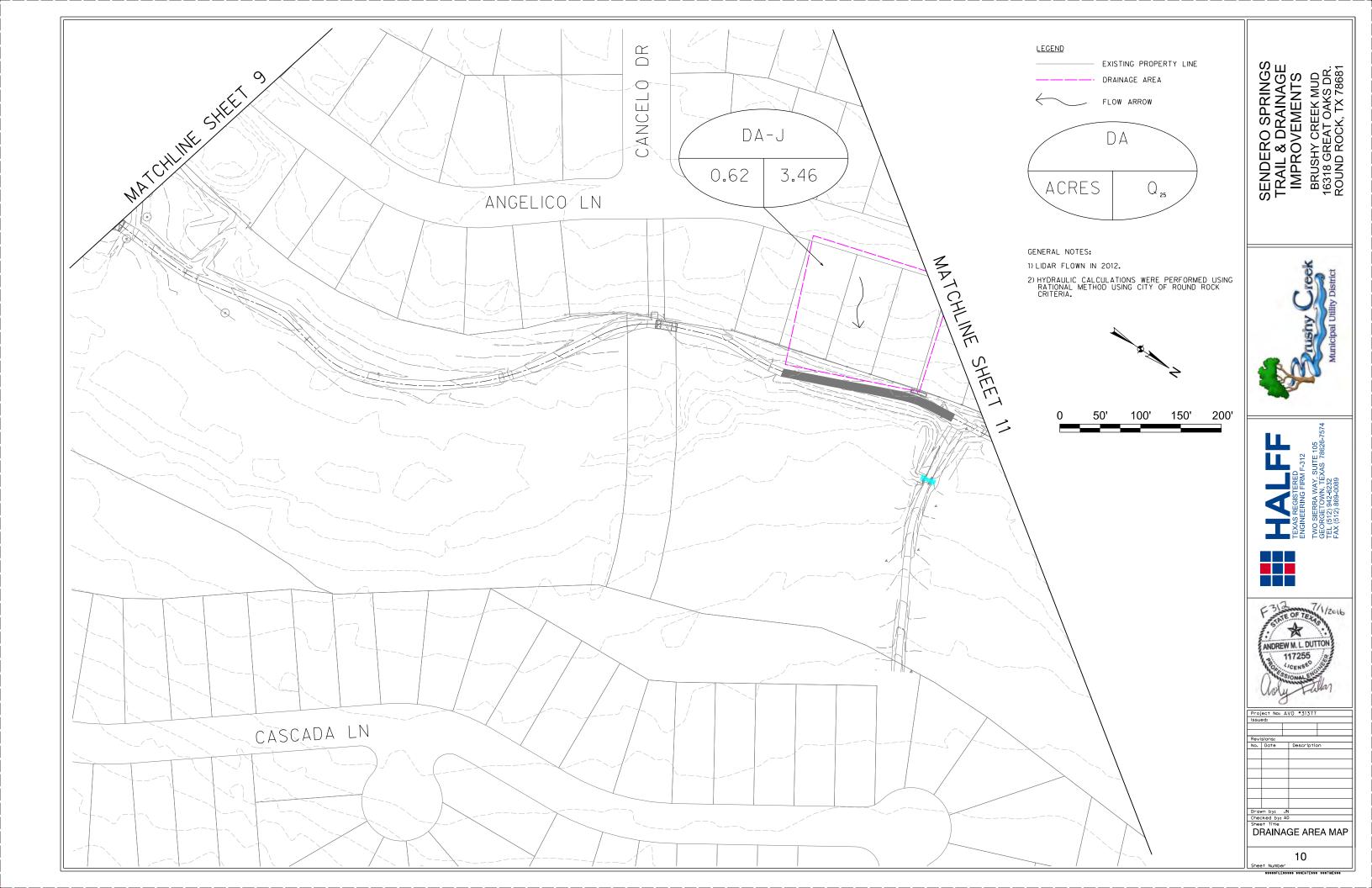
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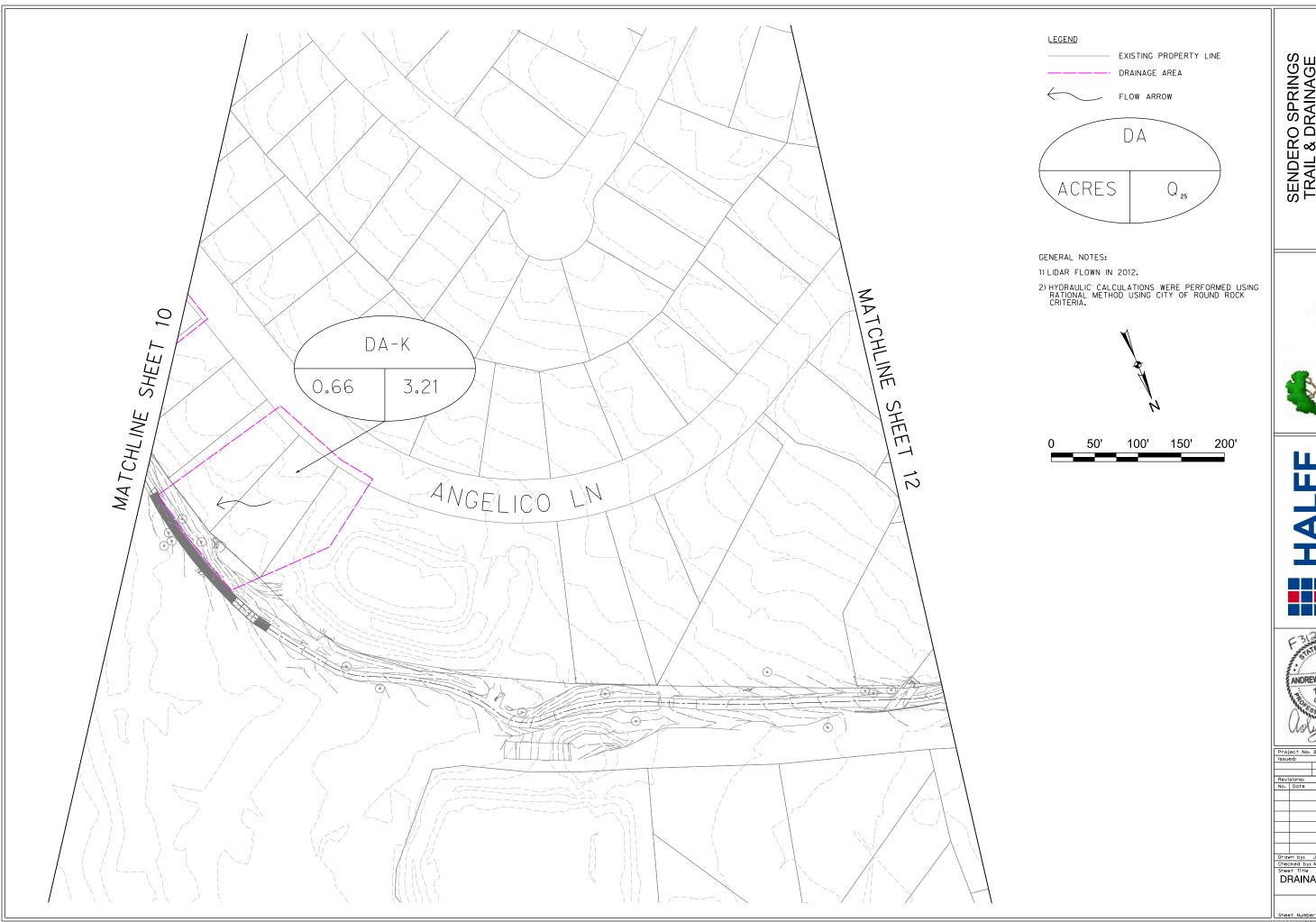
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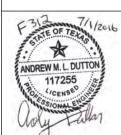






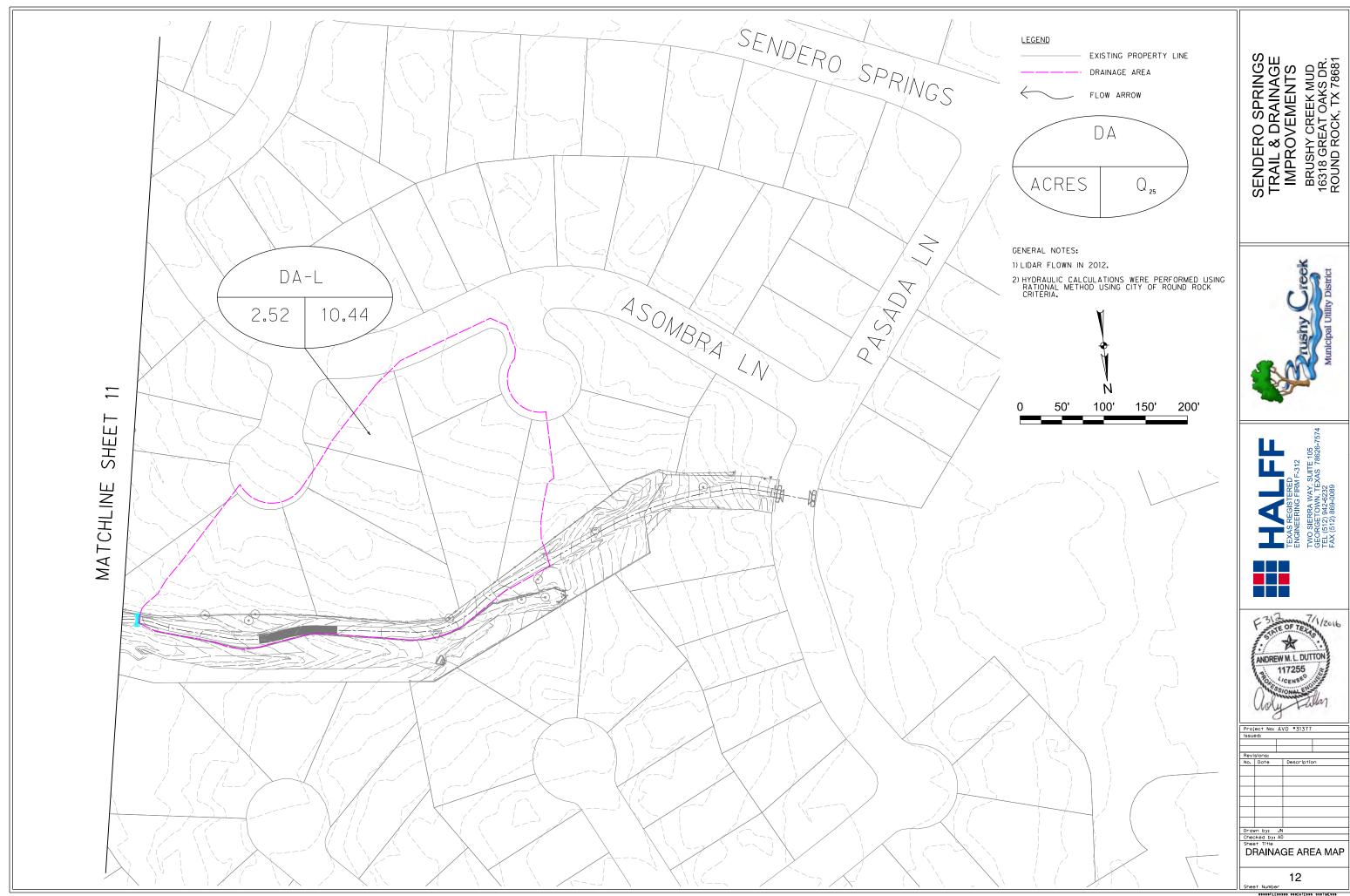






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11



Sendero Springs Trail Improvements -Area Hydraulic Calculations

			Ove	rland Flow		S	hallow C	Concentrate	d Flow	С	hannel Flo	W					
Area #	Area total (ac)		Slope (Ft/Ft)	Corrected Slope	Tt (Sheet flow) (mins)	Length (Ft) (Shall/ Concen)	Slope (Ft/Ft)	Corrected Slope	Tt (Shall/Concen) (mins)	Length (Ft) (Channel)	Velocity V - (Ft/s)	Tt(Channel) (mins)	Тс	Tc (Used)	Intensity i - (in/ hr)	C (runoff Coeff)	Q ₂₅ (Drng Area Flow) (cfs)
Α	0.62	100	0.01	0.010	12.47	20	0.03	0.030	0.12	375	4.00	1.56	14.15	14.15	7.13	0.54	2.39
B1	0.095	76	0.0658	0.066	4.71	0	0.00	0.005	0.00	92	4.00	0.38	5.10	5.10	10.07	0.51	0.49
B2	1.32	100	0.015	0.015	10.60	377	0.05	0.048	1.78	150	4.00	0.63	13.01	13.01	7.39	0.56	5.46
B1+B2	1.42	100	0.015	0.015	10.60	377	0.05	0.048	1.78	150	4.00	0.63	13.01	13.01	7.39	0.55	5.82
С	0.89	100	0.07	0.070	5.73	74	0.07	0.068	0.29	0	N/A	0.00	6.02	6.02	9.64	0.54	4.63
D	0.66	100	0.06	0.060	6.09	85	0.06	0.059	0.36	0	N/A	0.00	6.45	6.45	9.45	0.53	3.31
E1	1.39	100	0.05	0.050	6.55	100	0.05	0.050	0.46	205	3.00	1.14	8.15	8.15	8.80	0.62	7.58
E2	0.35	100	0.0244	0.024	8.73	37	0.03	0.027	0.23	44	3.00	0.24	9.20	9.20	8.44	0.48	1.42
E1+E2	1.74	100	0.05	0.050	6.55	100	0.05	0.050	0.46	387	3.00	2.15	9.16	9.16	8.45	0.59	8.71
F	0.685	100	0.045	0.045	6.83	30	0.03	0.033	0.17	212	3.00	1.18	8.18	8.18	8.79	0.63	3.79
G	0.535	100	0.02	0.020	9.45	48	0.04	0.042	0.24	120	4.00	0.50	10.19	10.19	8.13	0.58	2.52
Н	0.47	100	0.035	0.035	7.55	65	0.03	0.031	0.38	37	3.00	0.21	8.14	8.14	8.80	0.57	2.36
1	0.26	45	0.0511	0.051	3.43	0	0.00	0.005	0.00	100	3.00	0.56	3.98	5.00	10.11	0.36	0.95
J	0.62	100	0.05	0.050	6.55	38	0.08	0.079	0.14	165	3.00	0.92	7.61	7.61	9.00	0.62	3.46
K	0.66	100	0.04	0.040	7.16	102	0.07	0.069	0.40	0	N/A	0.00	7.56	7.56	9.01	0.54	3.21
L	2.52	100	0.025	0.025	8.64	332	0.05	0.048	1.56	335	5.00	1.12	11.32	11.32	7.81	0.53	10.44

Formulas/	Equations
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Time of Concentration	Ţc=Ţt(She	et)+Tt(Shall Concen)+Tt(Channel)		
Sheet Flow	Tt=	0.007((nL)^0.8)/((P ²)^0.5)((s)^0.4)	COA Table 2-3: ₱2=3.44 in	COA Table 2-2: n= 0.15
Shallow/ Concen. Flow	T ^t =	L/(60(16.1345)(s)^0.5)	S ≥ 0.5% (0.005 Ft/Ft)	T ^c ≥ 5 mins
Channel Flow	Tt=	L/V/60	V=approx. velocity based of	on running slope
Q=CiA COA Table	2-1: C=	Grass Flat slope=0.34 Gra	ss Avg Slope=0.42 Imper	vious (roof/pavement)=0.87
i= a/(Tc+b)^c (For	Tc = 5 mii	ns., COA Table 2-4 25yr. 5 min. value of	10.1 is used, all others use equat	ion. a= 82.93 b= 10.74 c= 0.7634

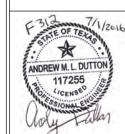
NOTES:

- 1) HYDRAULIC COMPUTATIONS ARE BASED ON CITY OF ROUND ROCK DRAINAGE SPECIFICATIONS.
- 2) RATIONAL METHOD WAS USED TO COMPUTE PEAK FLOWS.

TRAIL & DRAINGE TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR.







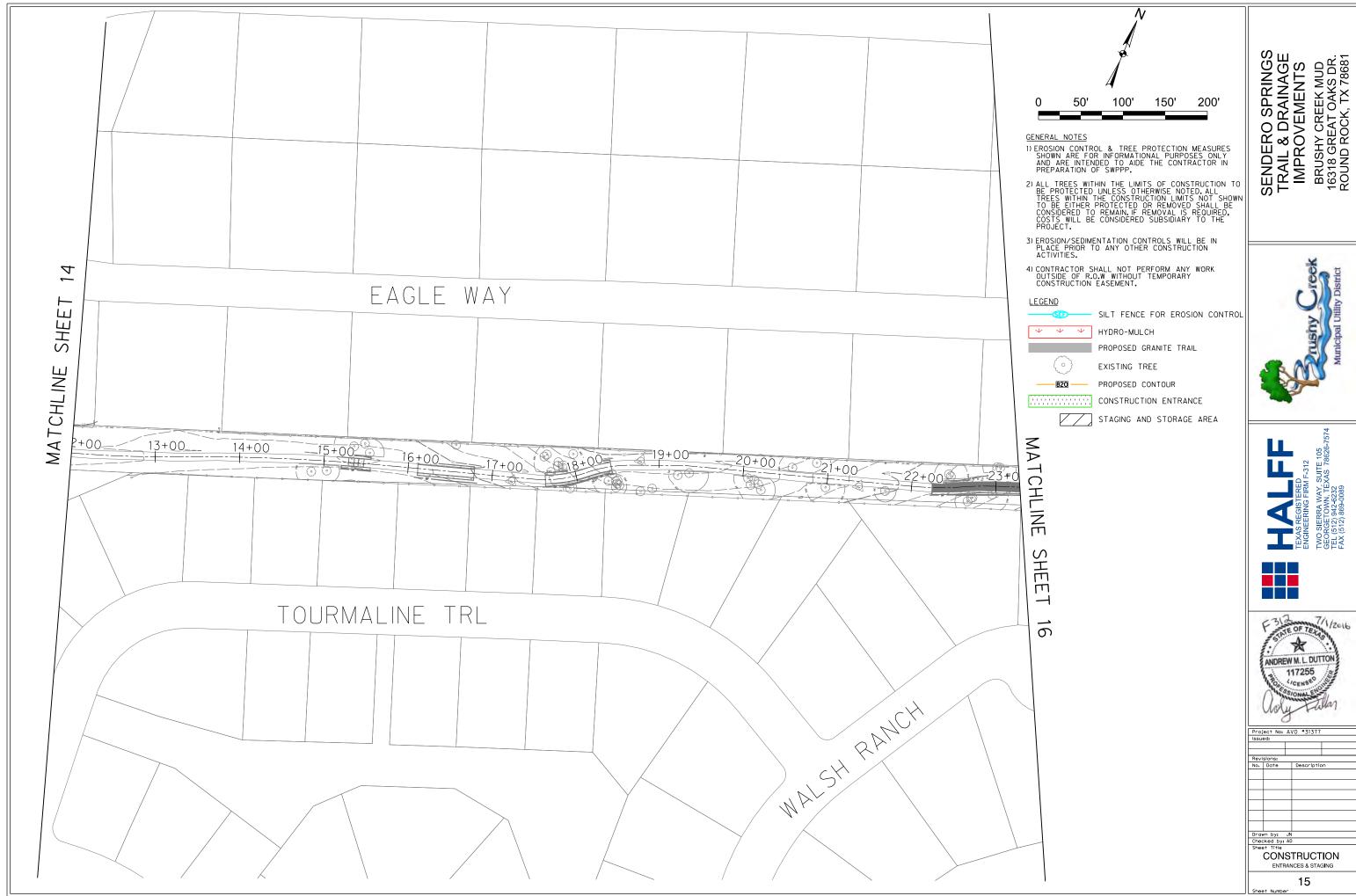
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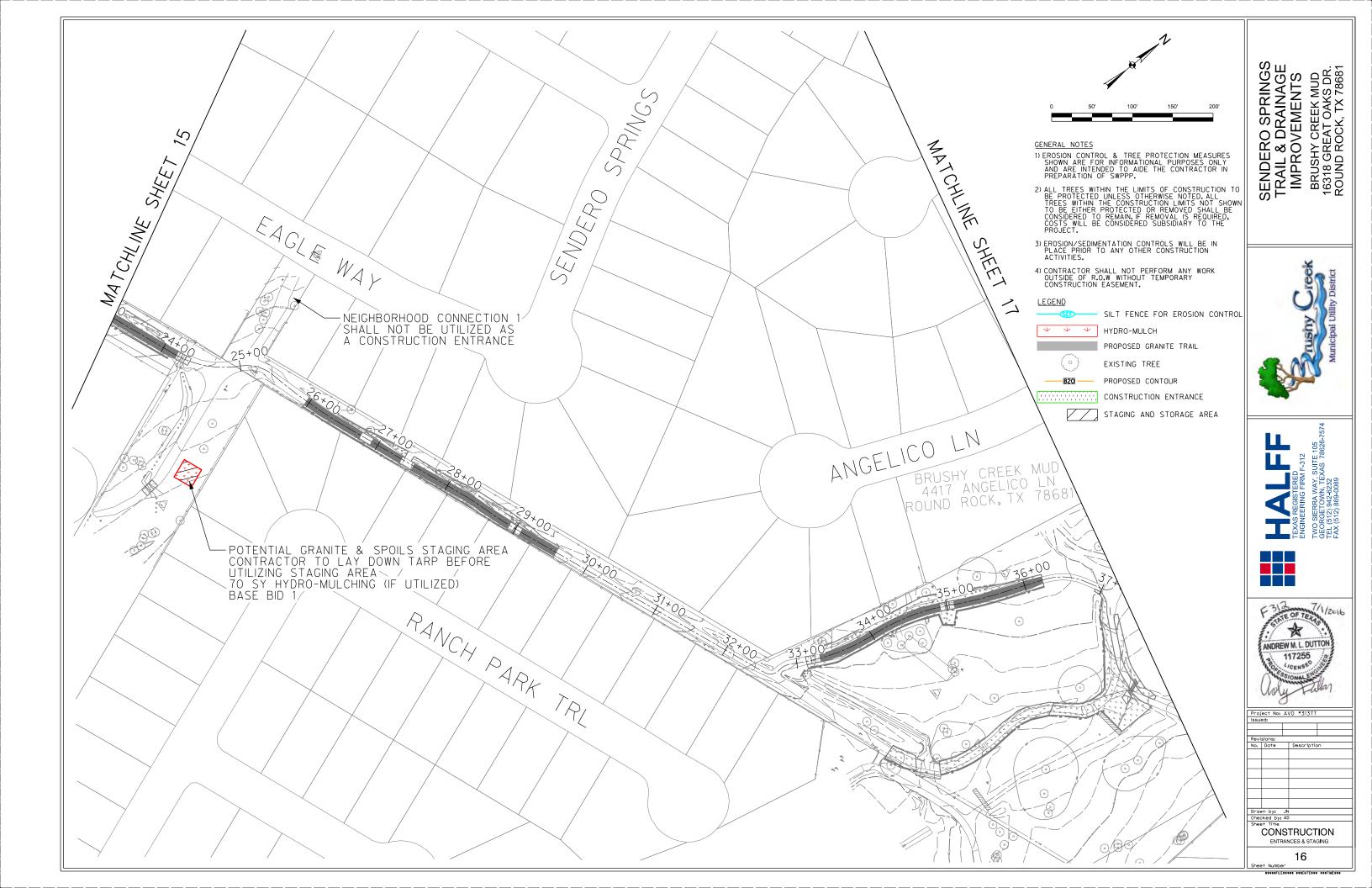
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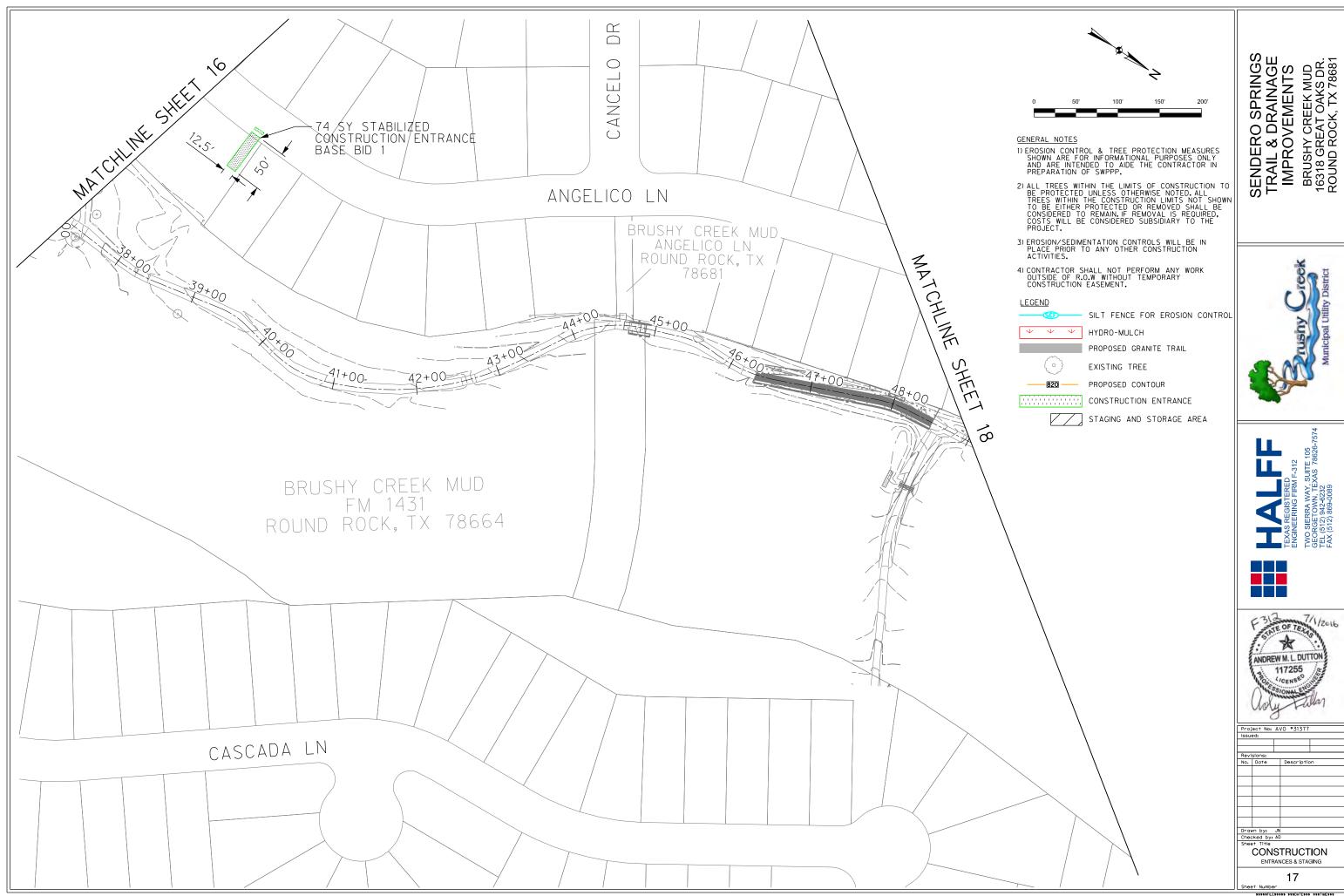


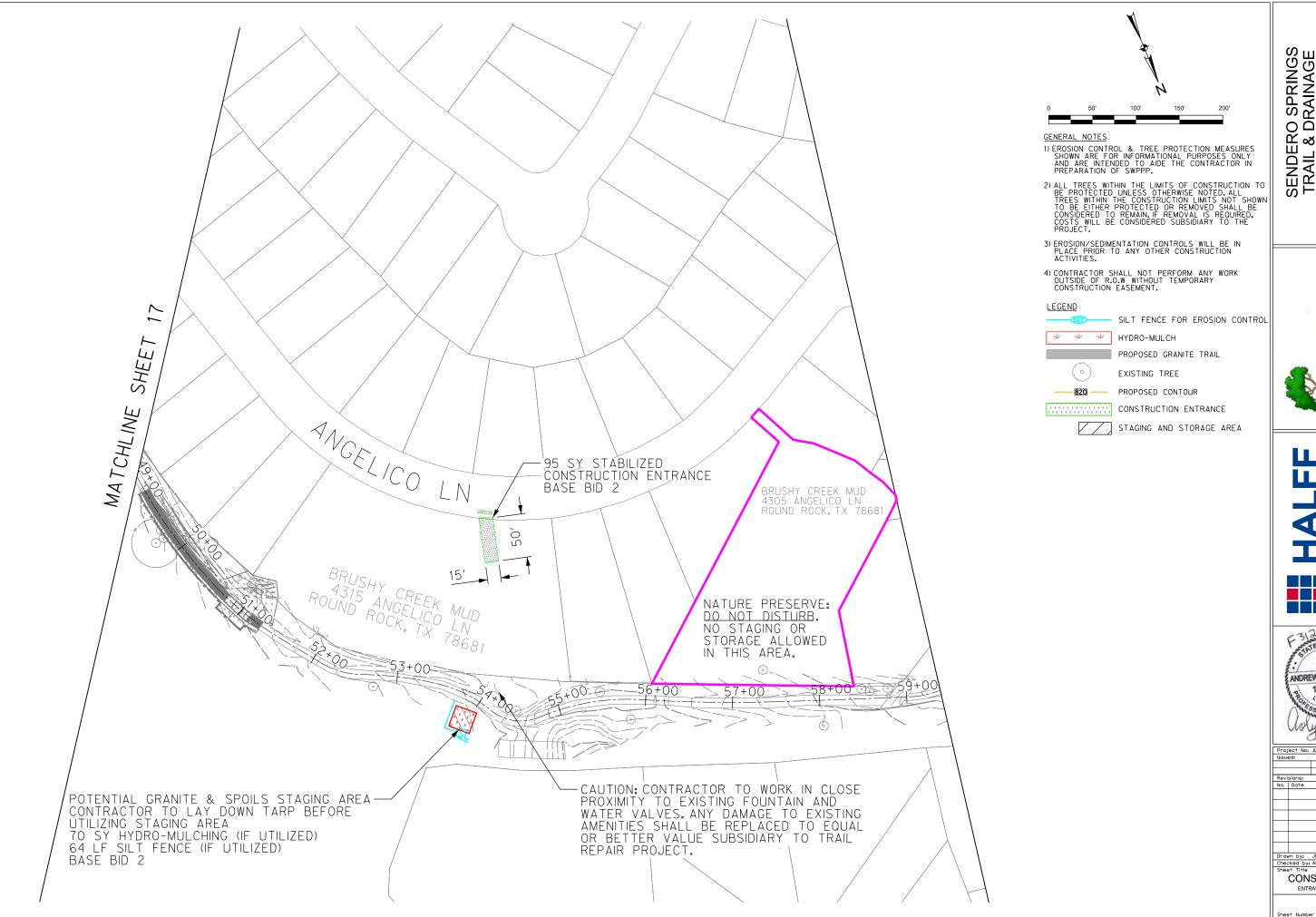






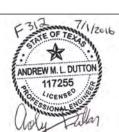








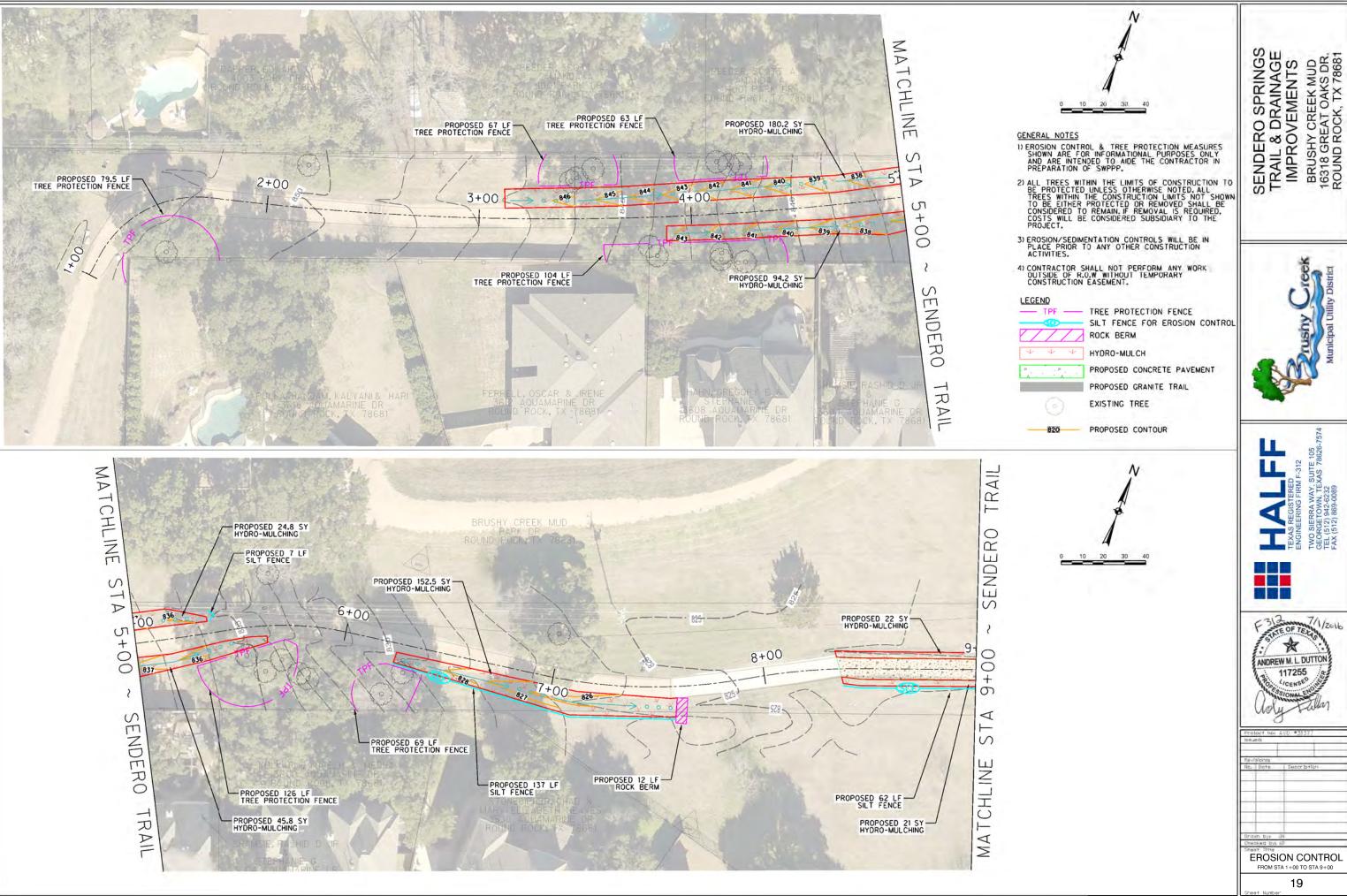
TEXAS REGISTERED ENGINEERING FIRM F-312 TWO SIERRA WAY, SUITE 105 GEONGETOWN, TEXAS 78626-7574 TEL (512) 942-6522 FAX (512) 869-0089

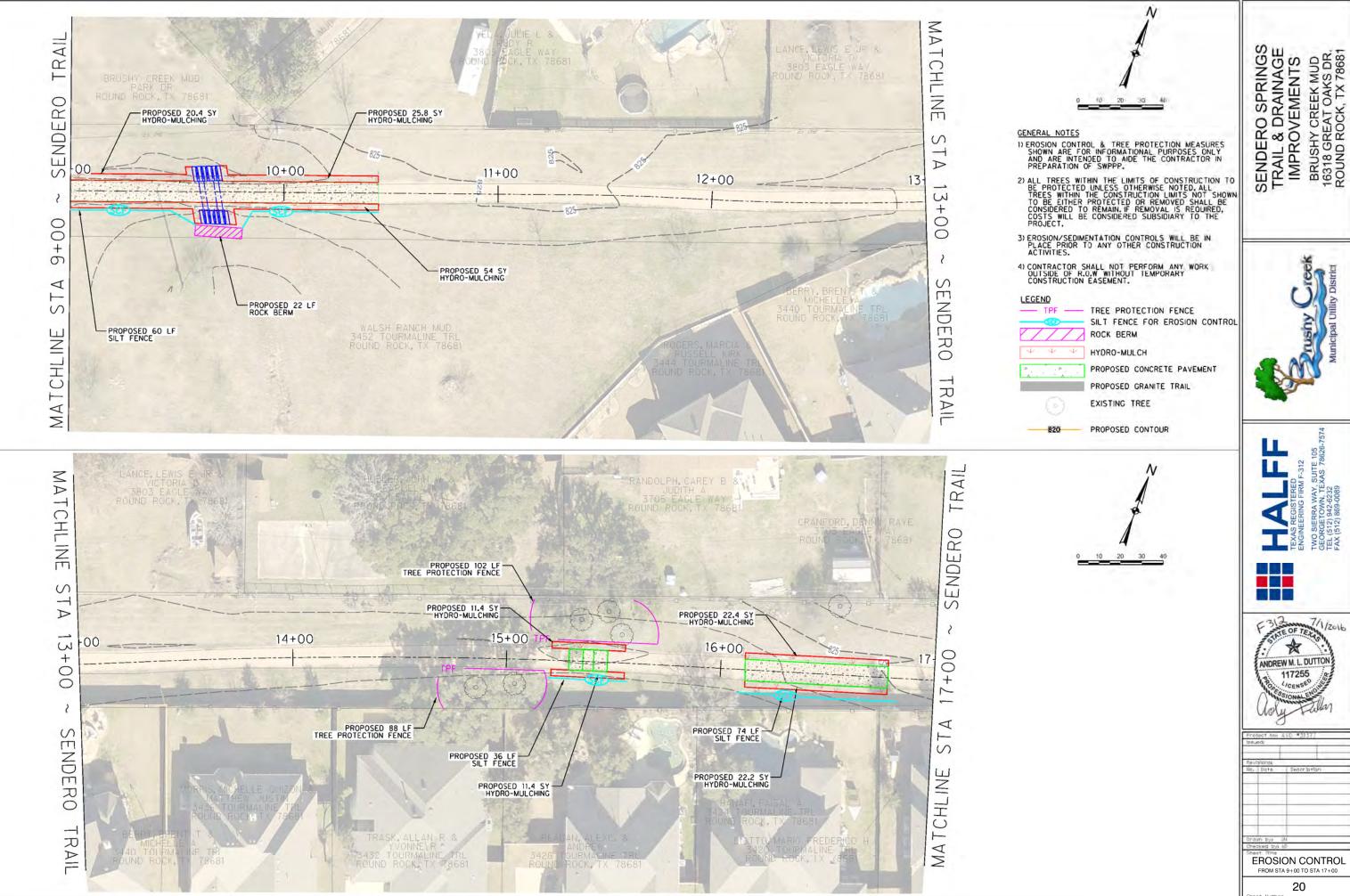


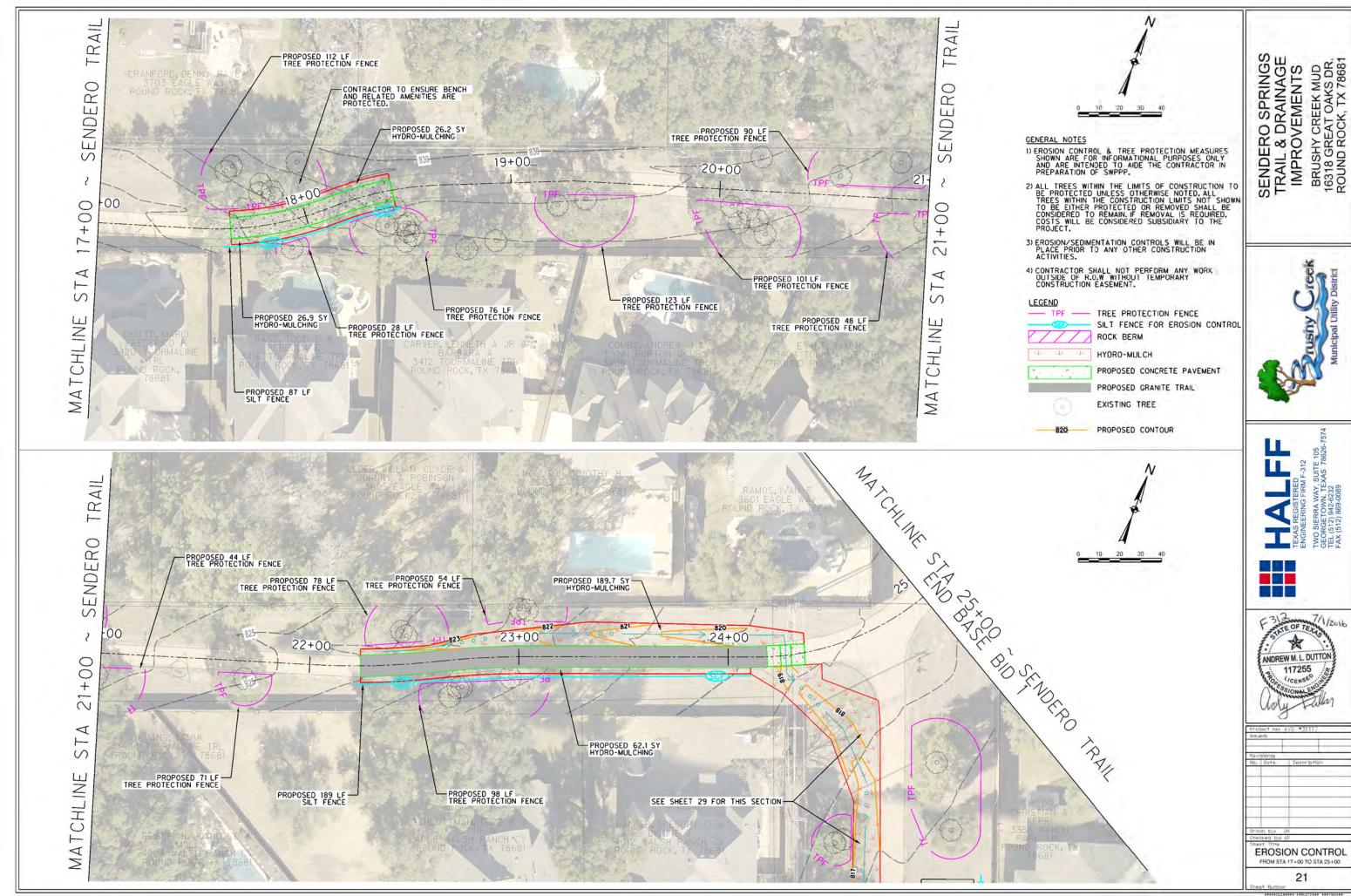
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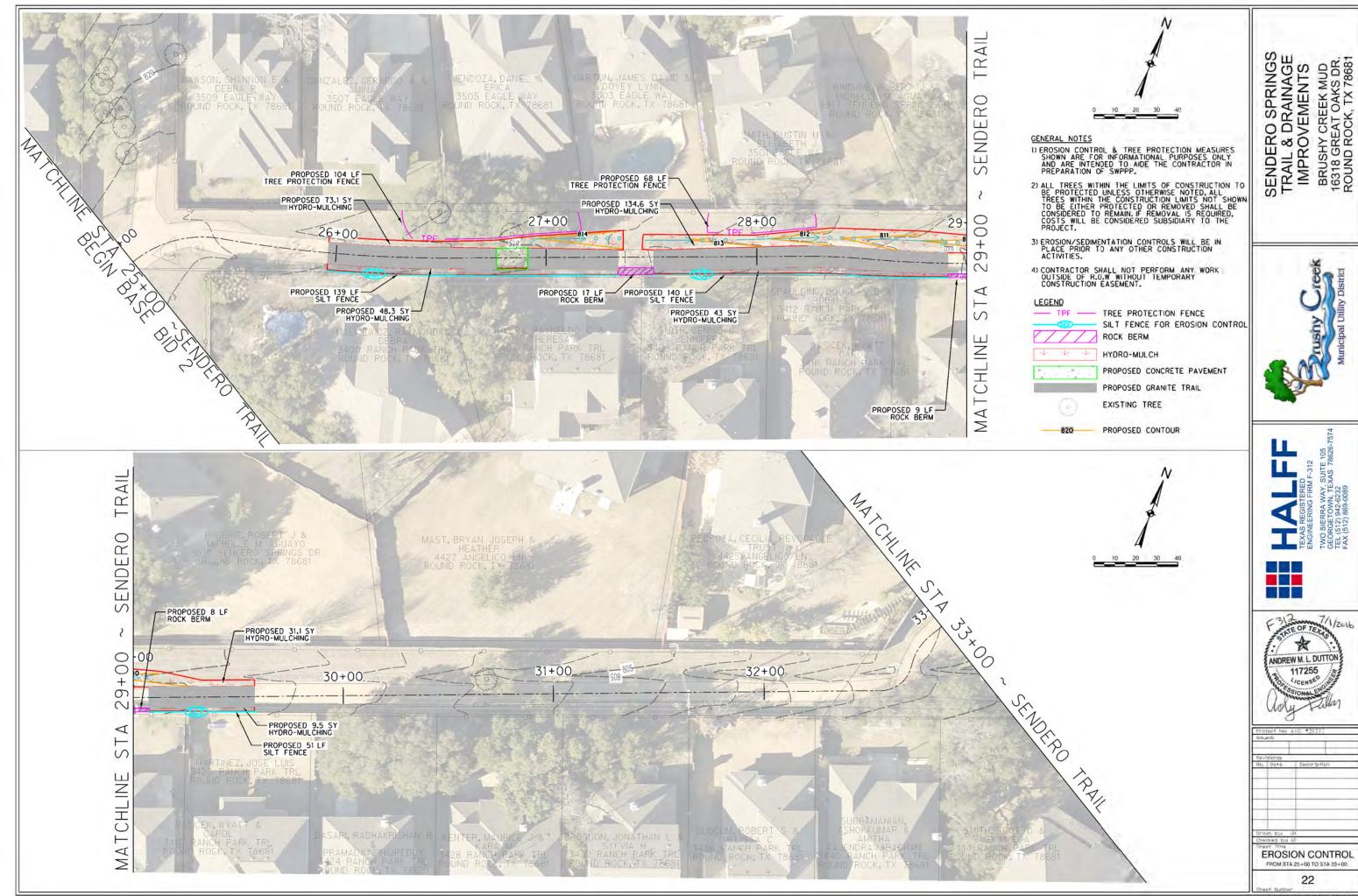
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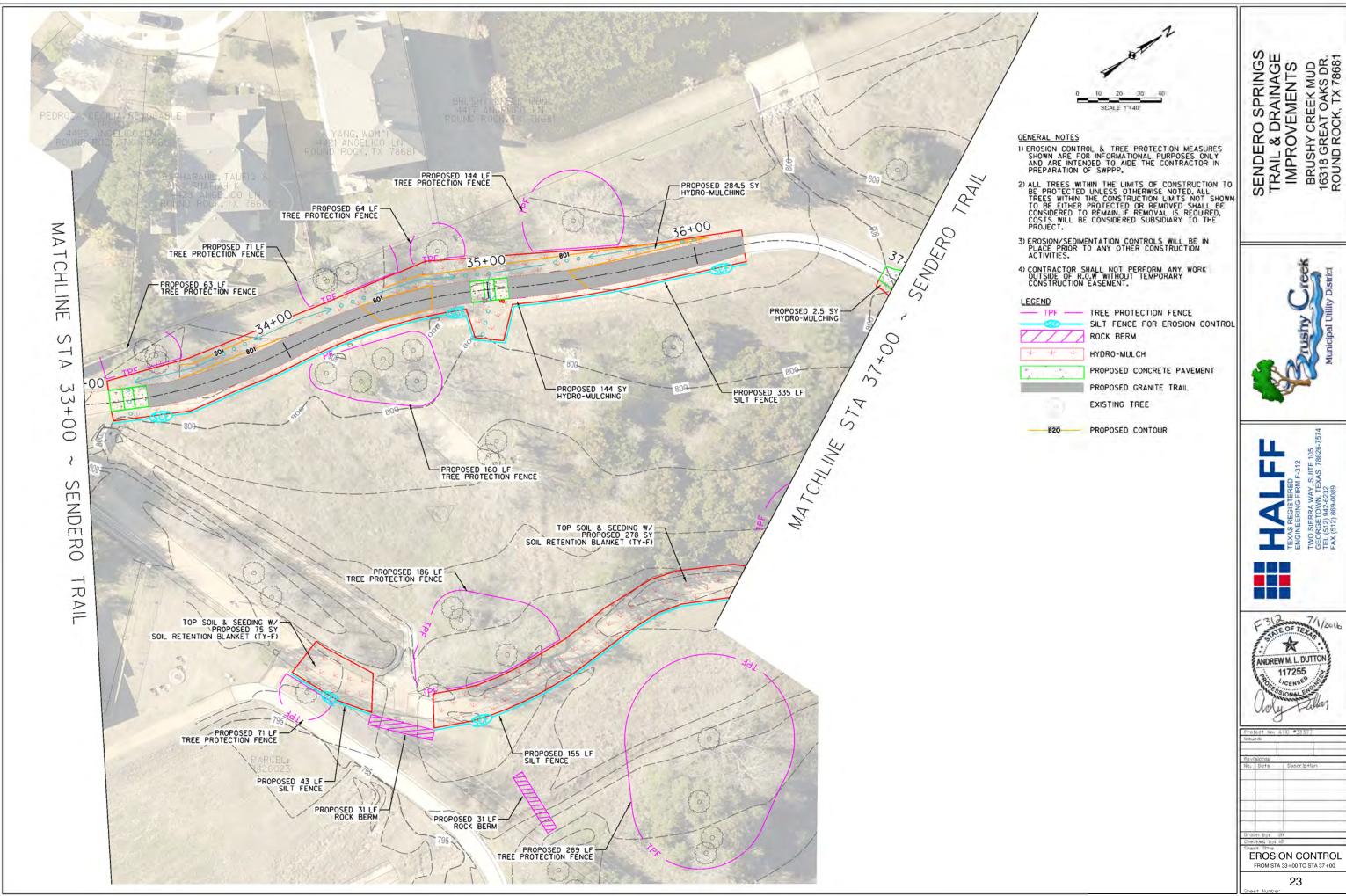




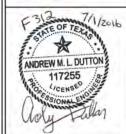


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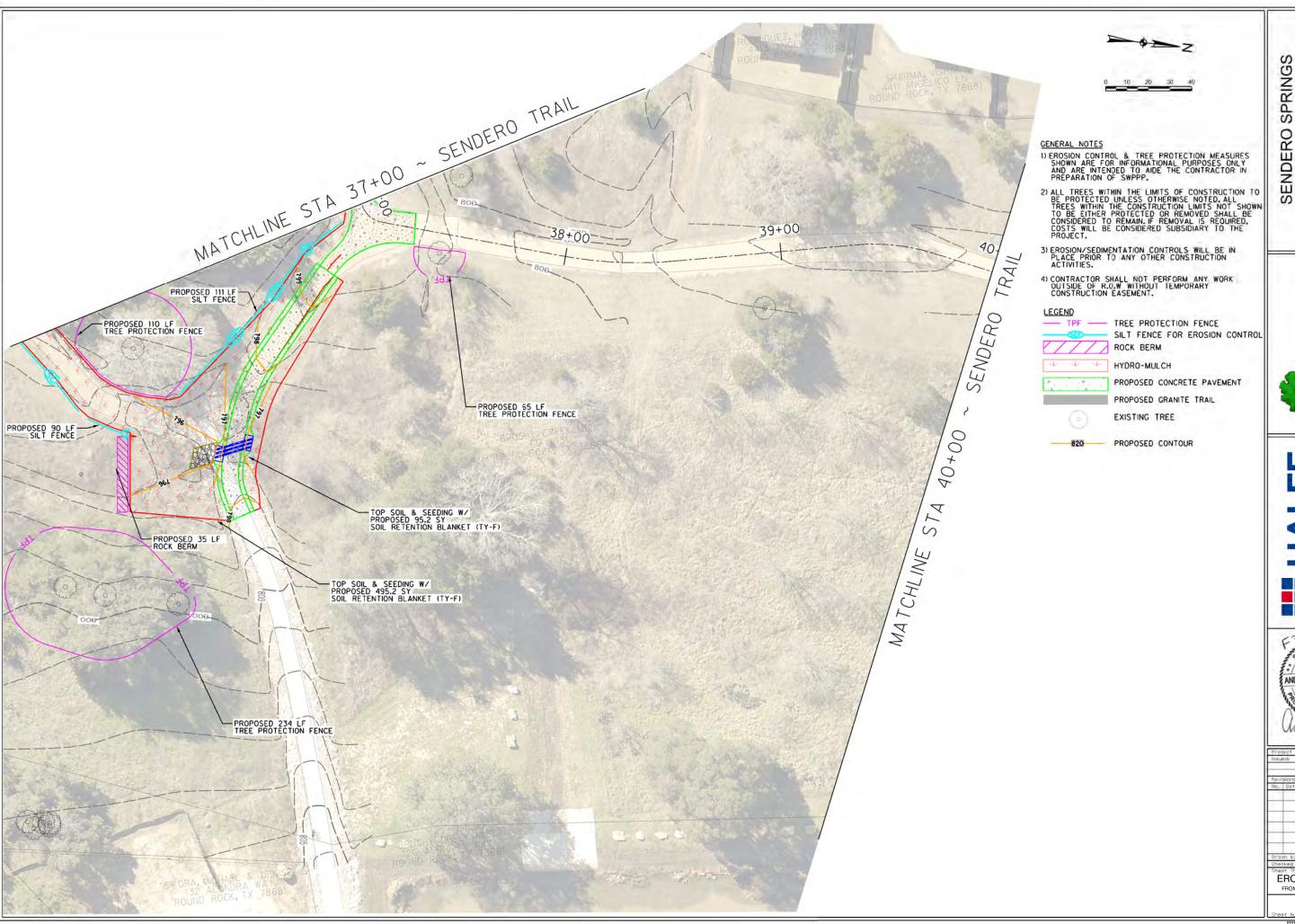




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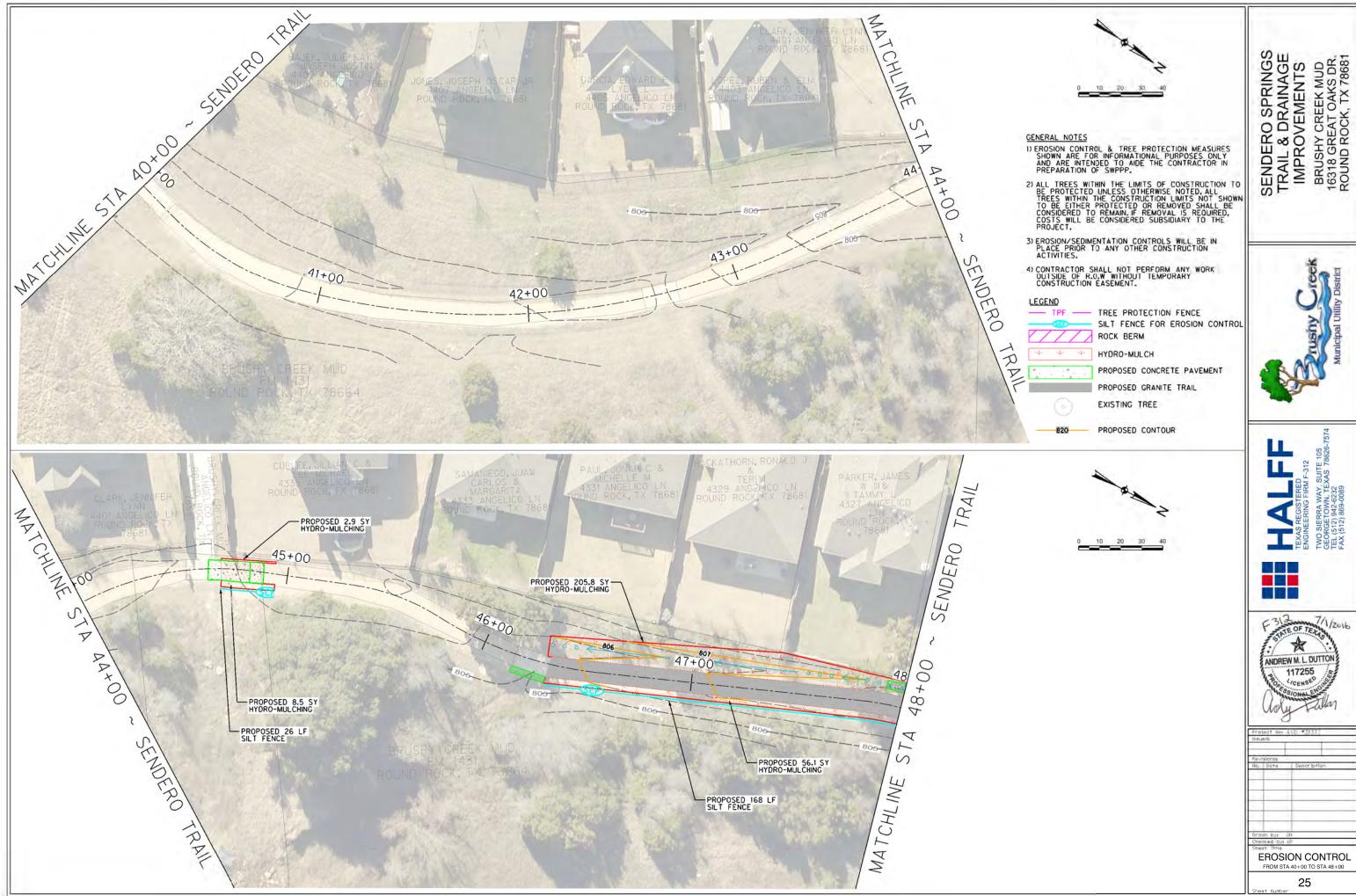


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ENGINEERING FIRM F-312
TWO SIERRA WAY, SUITE 105
GEORGETOWN TEXAS 78626-7574
TEL (5/12) 942-6232
FAX (5/12) 869-089

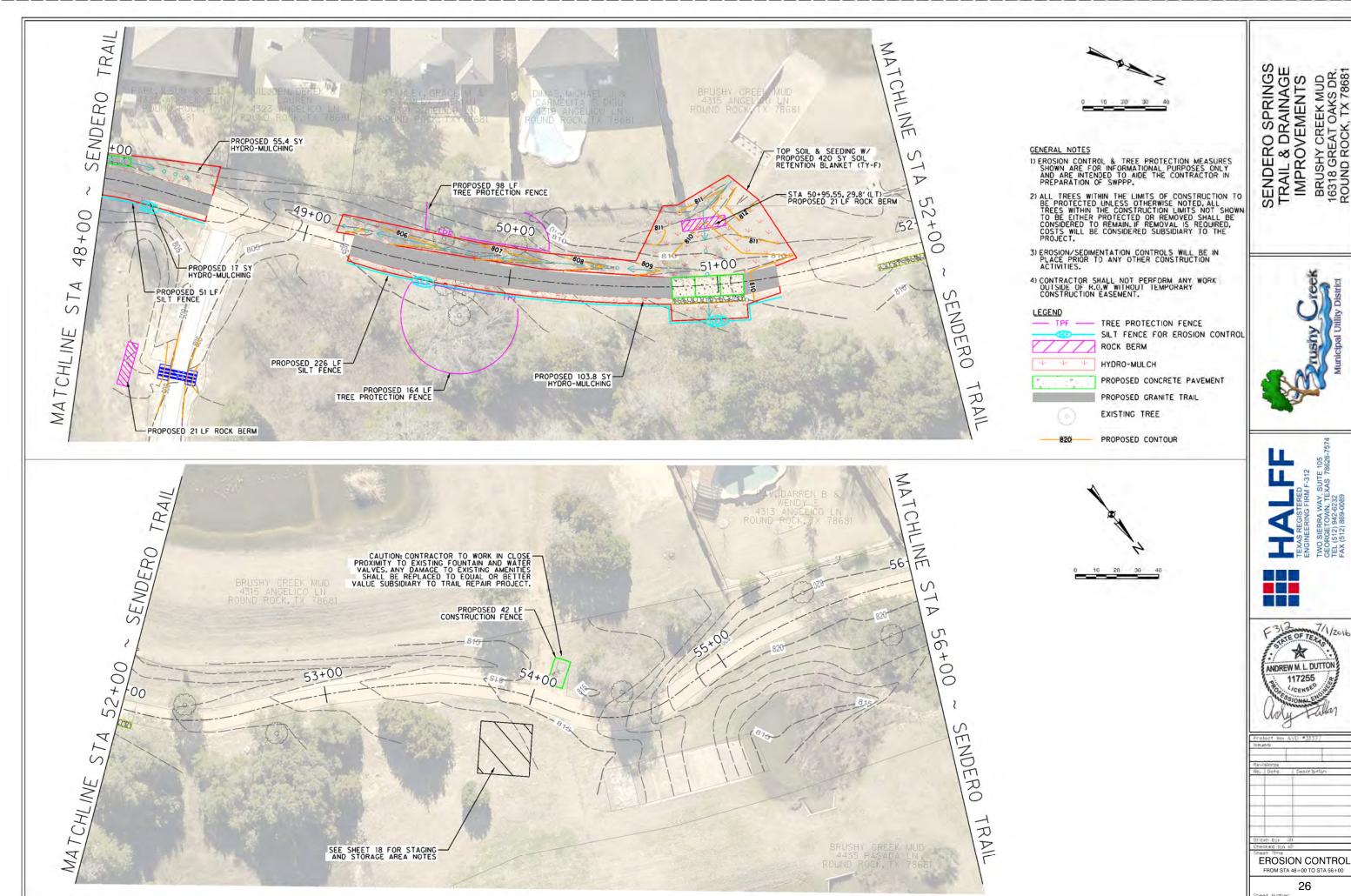
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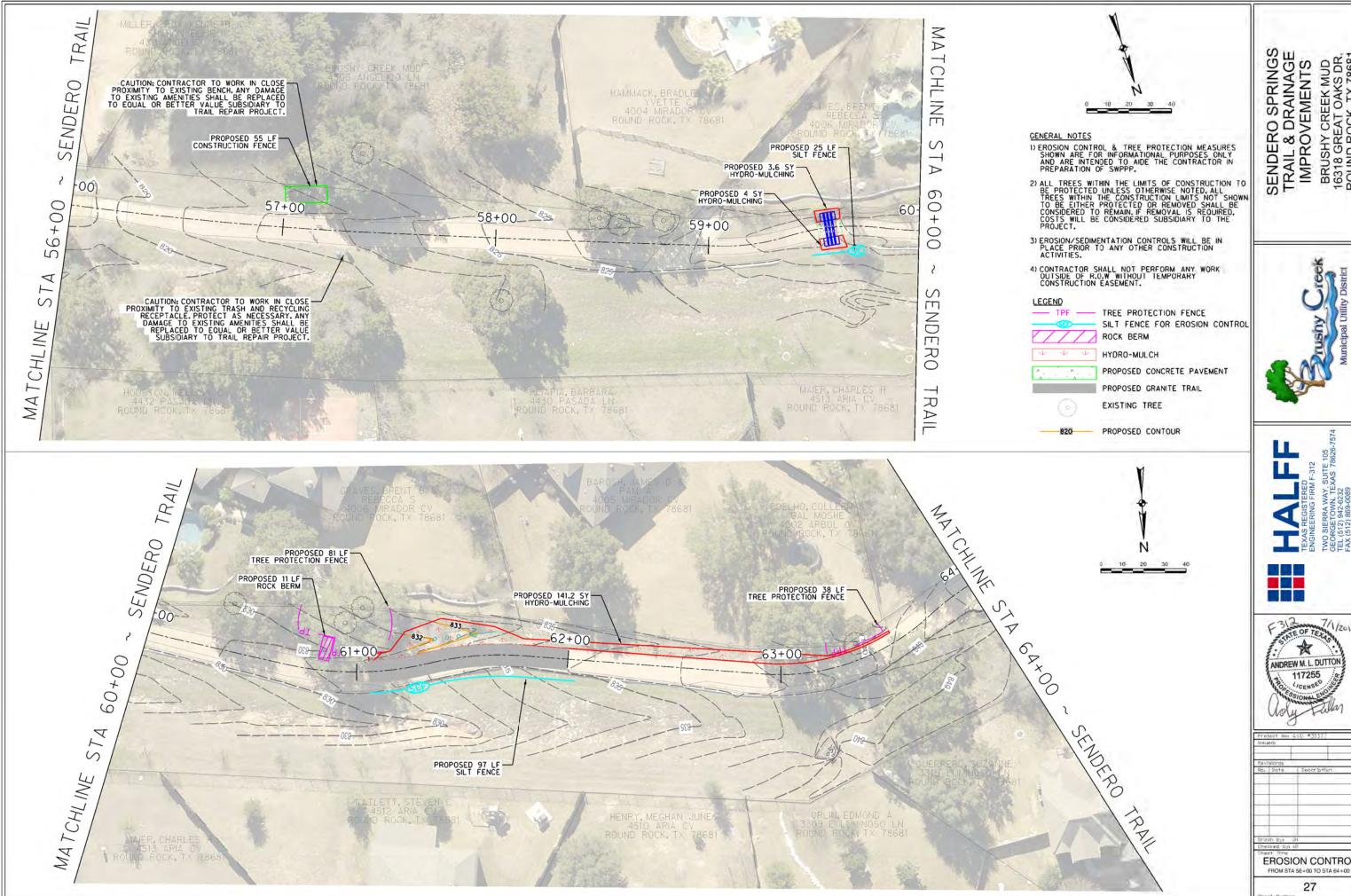
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BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681

AY, SUITE TEXAS

7/1/2016



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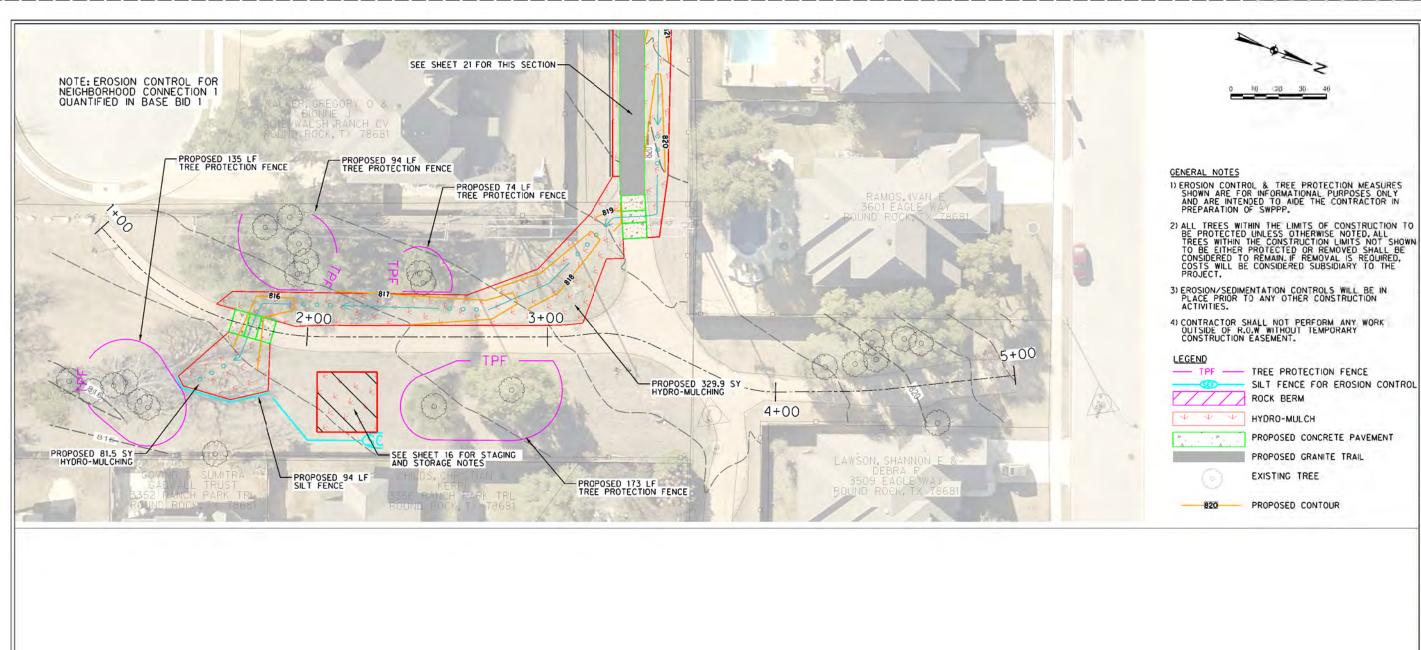




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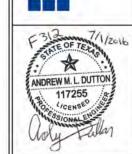
EROSION CONTROL FROM STA 64+00 TO STA 67+66.14

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TEXAS REGISTERED ENGINEERING FIRM F-312
TWO SIERRA WAY, SUITE 105
GEORGETOWN TEXAS 78626-7574
TEL (512) 942-6232
FAX (512) 869-0089

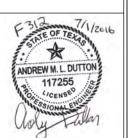


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EROSION CONTROL DETAILS 30

ALL TREES NOT LOCATED WITHIN THE LIMITS OF CONSTRUCTION AND OUTSIDE OF DISTURBED AREAS SHALL BE PRESERVED. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL TREES TO BE PRESERVED FROM HIS ACTIVITIES. ALL TREES SHOWN TO BE RETAINED WITHIN THE LIMITS OF CONSTRUCTION ON THE PLANS, SHALL BE PROTECTED DURING

CONSTRUCTION WITH FENCING. SEE: TREE PROTECTION TREE WELLS (EC-02), TREE PROTECTION TREE LOCATION (EC-03) AND TREE PROTECTION FENCE-CHAIN LINK (EC-04).

TREE PROTECTION FENCES SHALL BE ERECTED ACCORDING TO CITY STANDARDS FOR TREE PROTECTION, INCLUDING TYPES OF FENCING AND SIGNAGE.

TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK 4. IREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK
(CLEARING, GRUBBING, OR GRADING) AND SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF THE CONSTRUCTION
PROJECT.

5. EROSION AND SEDIMENTATION CONTROL BARRIERS SHALL BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT
RESULT IN SOIL BUILD-UP WITHIN TREE DRIPLINES.

6. FENCES SHALL COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES, LOCATED AT THE OUTERMOST LIMITS OF THE

TREE BRANCHES (DRIPLINE) OR CRITICAL ROOT ZONE (CRZ), WHICHEVER IS GREATER; AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROJECT IN ORDER TO PREVENT THE FOLLOWING:
6A. SOIL COMPACTION IN CRZ AREA RESULTING FROM VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT OR MATERIAL.
6B. CRZ DISTURBANCES DUE TO GRADE CHANGES OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE FORESTRY

MANAGER.

6C. WOUNDS TO EXPOSED ROOTS, TRUNK, OR LIMBS BY MECHANICAL EQUIPMENT
6D. OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CHEMICAL STORAGE, CONCRETE TRUCK CLEANING, AND FIRES.
EXCEPTIONS TO INSTALLING TREE FENCES AT THE TREE DRIPLINES OR CRZ, WHICHEVER IS GREATER, MAY BE PERMITTED IN
THE FOLLOWING CASES:

7A. WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, OR TREE WELL;
7B. WHERE PERMEABLE PAVING IS TO BE INSTALLED, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE

7C. WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE NO CLOSER THAN 6 FEET TO THE

WHERE THEES ARE SEVERE SPACE CONSTRAINTS DUE TO TRACT SIZE, OR OTHER SPECIAL REQUIREMENTS, CONTACT THE FORESTRY MANAGER TO DISCUSS ALTERNATIVES.

WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN A FENCE THAT IS CLOSER THAN 5 FEET TO A TREE TRUNK, THE

TRUNK SHALL BE PROTECTED BY STRAPPED-ON PLANKING TO A HEIGHT OF 8 FEET (OR TO THE LIMITS OF LOWER

BRANCHING) IN ADDITION TO THE REDUCED FENCING PROVIDED.

WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN AREAS OF UNPROTECTED ROOT ZONES UNDER THE DRIPLINE OR CRZ, WHICHEVER IS GREATER, THOSE AREAS SHOULD BE COVERED WITH 4 INCHES OF ORGANIC MULCH TO MINIMIZE SOIL

COMPACTION

10. ALL GRADING WITHIN CRZ AREAS SHALL BE DONE BY HAND OR WITH SMALL EQUIPMENT TO MINIMIZE ROOT DAMAGE. PRIOR TO GRADING, RELOCATE PROTECTIVE FENCING TO 2 FEET BEHIND THE GRADE CHANGE AREA.

11. ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL AND BACKFILLED WITH GOOD QUALITY TOP SOIL WITHIN TWO DAYS. IF EXPOSED ROOT AREAS CANNOT BE BACKFILLED WITHIN 2 DAYS, AN ORGANIC MATERIAL WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION SHALL BE PLACED TO COVER THE ROOTS UNTIL BACKFILL CAN OCCUR.

12. PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLINES, A CLEAN CUT SHALL BE MADE WITH A ROCK SAW OR SIMILAR EQUIPMENT, IN A LOCATION AND TO A DEPTH APPROVED BY THE FORESTRY MANAGER, TO MINIMIZE DAMAGE TO PERMAINING POOTS.

REMAINING ROOTS.

13. TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES WILL BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS ARE TO BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON LEAVES.

14. WHEN INSTALLING CONCRETE ADJACENT TO THE ROOT ZONE OF A TREE, A PLASTIC VAPOR BARRIER SHALL BE PLACED BEHIND THE CONCRETE TO PROHIBIT LEACHING OF LIMB INTO THE CRZ.

15. ANY TRENCHING REQUIRED FOR THE INSTALLATION OF LANDSCAPE IRRIGATION SHALL BE PLACED AS FAR FROM EXISTING

TREE TRUNKS AS POSSIBLE

TREE TRUNKS AS POSSIBLE.

16. NO LANDSCAPE TOPSOIL DRESSING GREATER THAN FOUR (4) INCHES SHALL BE PERMITTED WITHIN THE DRIPLINE OR CRZ

OF TREES, WHICHEVER IS GREATER, NO TOPSOIL IS PERMITTED ON ROOT FLARES OF ANY TREE.

17. PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC, AND CONSTRUCTION EQUIPMENT SHALL TAKE

PLACE BEFORE CONSTRUCTION BEGINS. ALL PRUNING MUST BE DONE ACCORDING TO CITY STANDARDS AND AS OUTLINED IN

PLACE BEFORE CONSIDER OF THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA PRUNING TECHNIQUES).

18. ALL OAK TREE CUTS, INTENTIONAL OR UNINTENTIONAL, SHALL BE SEALED WITH AN APPROVED PRUNING SEALER IMMEDIATELY (WITHIN 10 MINUTES). TREE PAINT MUST BE KEPT ON SITE AT ALL TIMES.

19. THE FORESTRY MANAGER HAS THE AUTHORITY TO REQUIRE ADDITIONAL TREE PROTECTION BEFORE OR DURING

CONSTRUCTION

CONSTRUCTION.

20. TREES APPROVED FOR REMOVAL SHALL BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED. REFER TO THE CITY OF ROUND ROUND ROCK TREE TECHNICAL MANUAL FOR APPROPRIATE REMOVAL METHODS.

21. PRIOR TO CONSTRUCTION, ALL LOWER TREE LIMBS OVER ROADWAY'S MUST BE PRUNED TO A HEIGHT OF 14 FEET USING THE TECHNIQUES DESCRIBED IN THE CITY OF ROUND ROCK TREE TECHNICAL MANUAL.

22. DEVIATIONS FROM THE ABOVE REQUIREMENTS AND NEGLIGENT DAMAGE TO TREES MAY BE CONSIDERED AS ORDINANCE

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE FORESTRY MANAGER.

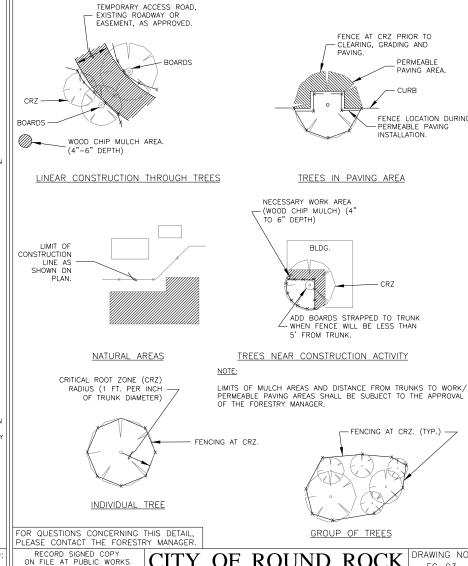
THE ARCHITECT/ENGINEER ASSUMES
RESPONSIBILITY FOR THE APPROPRIATE
USE OF THIS DETAIL. (NOT TO SCALE

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS CITY OF ROUND ROCK **APPROVED** 03-25-11 DATE TREE PROTECTION NOTES

APPROVED

03-25-11

DATE

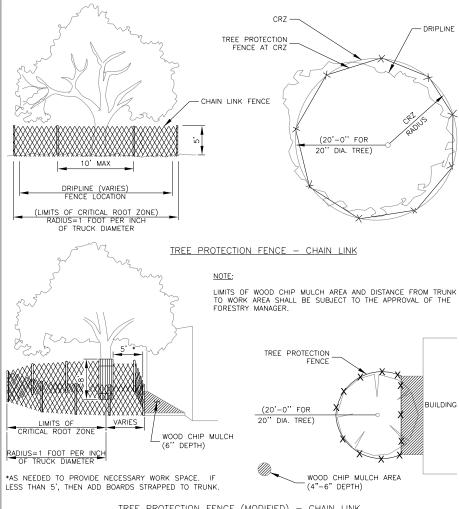


CITY OF ROUND ROCK EC-03

TREE PROTECTION THE ARCHITECT/ENGINEER ASSUMES
RESPONSIBILITY FOR THE APPROPRIATE
USE OF THIS DETAIL. (NOT TO SCALE: FENCE LOCATIONS

ROUND ROOK TEXAS I

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TREE PROTECTION FENCE (MODIFIED) - CHAIN LINK

FOR QUESTIONS CONCERNING THIS DETAIL. PLEASE CONTACT THE FORESTRY MANAGER.

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE

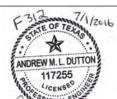
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FENCE CHAIN LINK

ROUND ROCK, TEXAS





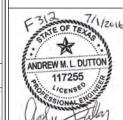




BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681









STEEL FENCE POSTS (MAXIMUM 6' SPACING) WOVEN WIRE SUPPORT (12-1/2 GAUGE NET BACKING) WOVEN WIRE SHEATHING 24" MIN **ISOMETRIC**

50' MIN STREET R.O.W. GRADE TO PREVENT -RUNOFF FROM LEAVING SITE EXISTING GRADE TO ROADWAY CROSS SECTION

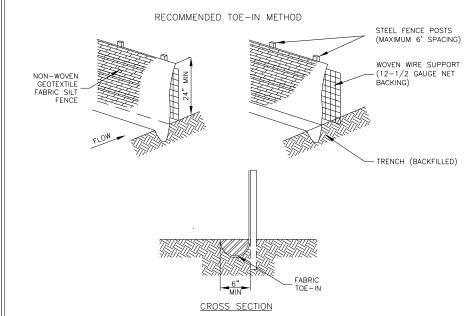
- STONE SIZE SHALL BE 3" 8" OPEN GRADED ROCK. THICKNESS OF CRUSHED STONE PAD TO BE NOT LESS THAN 8". LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL ROADWAY, AND WIDTH NOT LESS THAN FULL WIDTH OF
- LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL KOADWAY, AND WIDTH NOT LESS THAN FOLL WIDTH OF INGRESS/EGRESS.

 ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

 THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY BY CONTRACTOR.

 AS NECESSARY, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS APPROVED	CITY OF ROUND ROCK	DRAWING NO: EC-09
03-25-11 DATE	STABILIZED CONSTRUCTION	-
THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)	ENTRANCE DETAIL	ROUND ROCK TEXAS PURPOR INSERN PROFFRETTY



03-25-11

DATE

THE ARCHITECT/ENGINEER ASSUMES
RESPONSIBILITY FOR THE APPROPRIATE
USE OF THIS DETAIL. (NOT TO SCALE:

- STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MIN. OF ONE (1') FOOT. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G. PAVEMENT) WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW
- DEFINENCE.

 THE TRENCE IN (E.G. PAREMENT) WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON OPHILL SIDE TO PREVENT FLOW UNDER FENCE.

 THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

 SILT FENCE SHALL BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS SECURELY FASTENED TO THE STEEL FENCE POSTS.

 INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

- MADE PROMPTLY AS NEEDED.
 SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
 ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES. THE SILT SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION. SILT FENCE SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED

CITY OF ROUND ROCK DRAWING NO EC-10 RECORD SIGNED COPY ON FILE AT PUBLIC WORKS APPROVED

SILT FENCE DETAIL



THE ROCK BERM SHALL BE INSPECTED DAILY OR AFTER EACH RAIN, OF THE STORE AND/ OR FABRIC CORE—MOVEN SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SEDIMENT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC. IF SEDIMENT REACHES A DEPTH OF 6", THE SEDIMENT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SEDIMENTATION PROBLEM.

WHEN THE SITE IS COMPLETELY STABILIZED, THE BERM AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

RECORD SIGNED COPY ON FILE AT PUBLIC WORKS **APPROVED**

NOTES

03-25-11 DATE THE ARCHITECT/ENGINEER ASSUMES
RESPONSIBILITY FOR THE APPROPRIATE
USE OF THIS DETAIL. (NOT TO SCALE:

ROCK BERM DETAIL

CITY OF ROUND ROCK | DRAWING NO: EC-12

THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 1" OPENING AND MINIMUM WIRE DIAMETER OF 20 GAUGE.
THE ROCK BERM SHALL BE INSPECTED DAILY OR AFTER EACH RAIN, AND THE STONE AND/ OR FABRIC

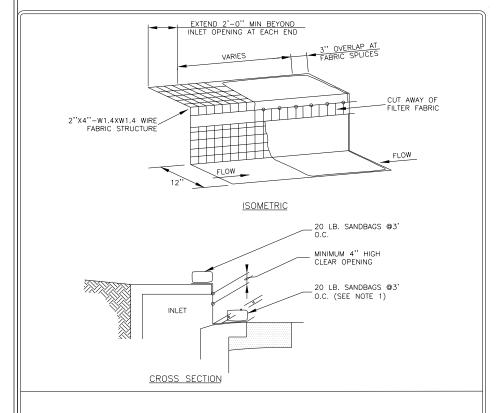
USE ONLY OPEN GRADED ROCK (3 to 5") DIAMETER FOR ALL CONDITIONS.

FLOW

└ 4" MIN

CROSS SECTION

EROSION CONTROL DETAILS

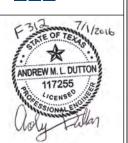


- 1. WHERE MINIMUM CLEARANCES CAUSE TRAFFIC TO DRIVE IN THE GUTTER, THE CONTRACTOR MAY SUBSTITUTE A
 1" X 4" BOARD SECURED WITH CONCRETE NAILS 3' O.C. NAILED INTO THE GUTTER IN LIEU OF SANDBAGS TO
 HOLD THE FILTER DIKE IN PLACE. UPON REMOVAL, CLEAN ANY DIRT/DEBRIS FROM NAILING LOCATIONS, APPLY
 CHEMICAL SANDING AGENT AND APPLY NON-SHRINK GROUT FLUSH WITH SURFACE OF GUTTER.
 2. A SECTION OF FILTER FABRIC SHALL BE REMOVED AS SHOWN ON THIS DETAIL OR AS DIRECTED BY THE
 ENGINEER OR DESIGNATED REPRESENTATIVE. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR
 HOG RINGS AT THIS LOCATION.
 3. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN
 DEPTH REACHES 2".
 4. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND
 IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM-WATER BEGINS TO OVERTOP THE CURB.
 5. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.

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	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE		11 1	TROTECTION	DETAIL	PURPOR, PRISION, PROSPERIT



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4. THE SUBGRADE SHALL BE TESTED BY "PROOF ROLLING" AND SHALL CONFORM COA STANDARD SPECIFICATION ITEM NO. 236S.

5. FIELD DENSITY DETERMINATIONS SHALL BE MADE IN ACCORDANCE WITH TXDOT TEST METHOD TEX-115-E.

6. THE SURFACE LAYER SHALL BE SPRINKLED AS REQUIRED TO BRING THE MATERIAL TO OPTIMUM MOISTURE CONTENT, THEN COMPACTED IN ACCORDANCE WITH COA STANDARD SPECIFICATION ITEM NO. 210S, "FLEXIBLE BASE" TO THE EXTENT NECESSARY TO PROVIDE NOT LESS THAN 92% OF THE OPTIMUM DENSITY. IN NO CASE SHALL THE MATERIAL BE WORKED AT MORE THAN 2% ABOVE OR BELOW OPTIMUM MOISTURE.

10'(TYP.) EXISTING TRAIL -WIDTH VARIES 1′ (TYP.) 1.5% MAX

PROPOSED TYPICAL GRAVEL TRAIL CROSS SECTION

PROPOSED TYPICAL CONCRETE TRAIL SECTION N.T.S.

- N.T.S.

(2)

(3)

NOTES:

10'(TYP.) EXISTING GROUND 1.5% MAX

PAVEMENT SECTION

- 5" REINFORCED CONCRETE PAVEMENT W/#3 BARS TYPE ICONCRETE 4,500 PSISTRENGTH AT 28 DAYS PER SPEC. 360S
- (2) EMBANKMENT
- 6" FLEXIBLE BASE PER SPEC. 210S
- 6" SUBGRADE PREPARATION

NOTES:

- 1. CONTRACTOR SHALL ENSURE NO PONDING OCCURS ON THE PATH.
- 2. ALL CONCRETE TO BE 5" THICK WITH #3 BARS @ 18" O.C.E.W. REINFORCEMENT. ALL REINFORCING BARS SHALL BE CENTERED VERTICALLY USING CHAIRS.
- 3. FLEXIBLE BASE WILL EXTEND 1 FOOT BEYOND THE EDGE OF PAVEMENT.
- 4. CONTRACTOR WILL ENSURE THAT ALL CROSS SLOPES ARE 2% MAX.

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681

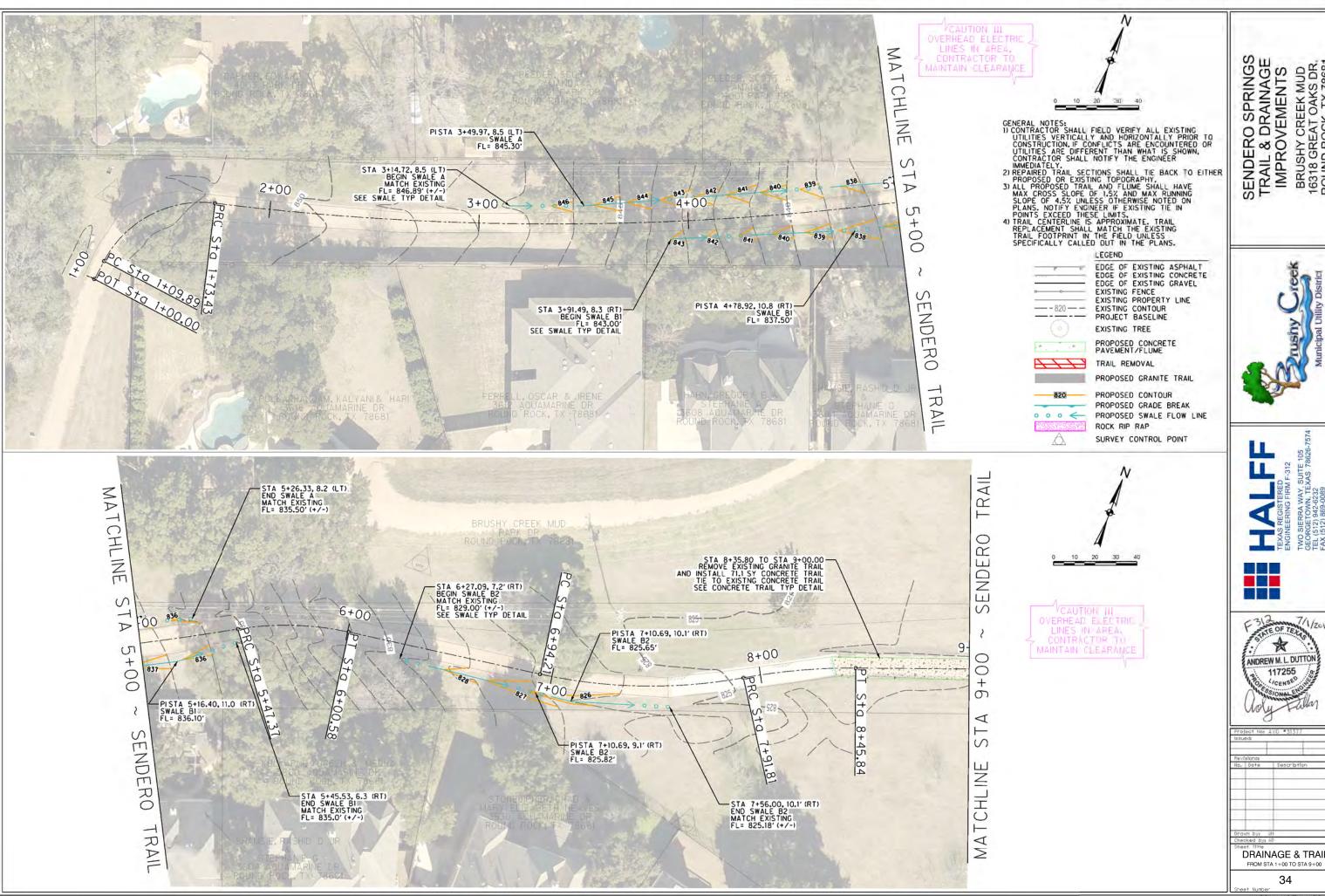






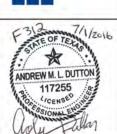
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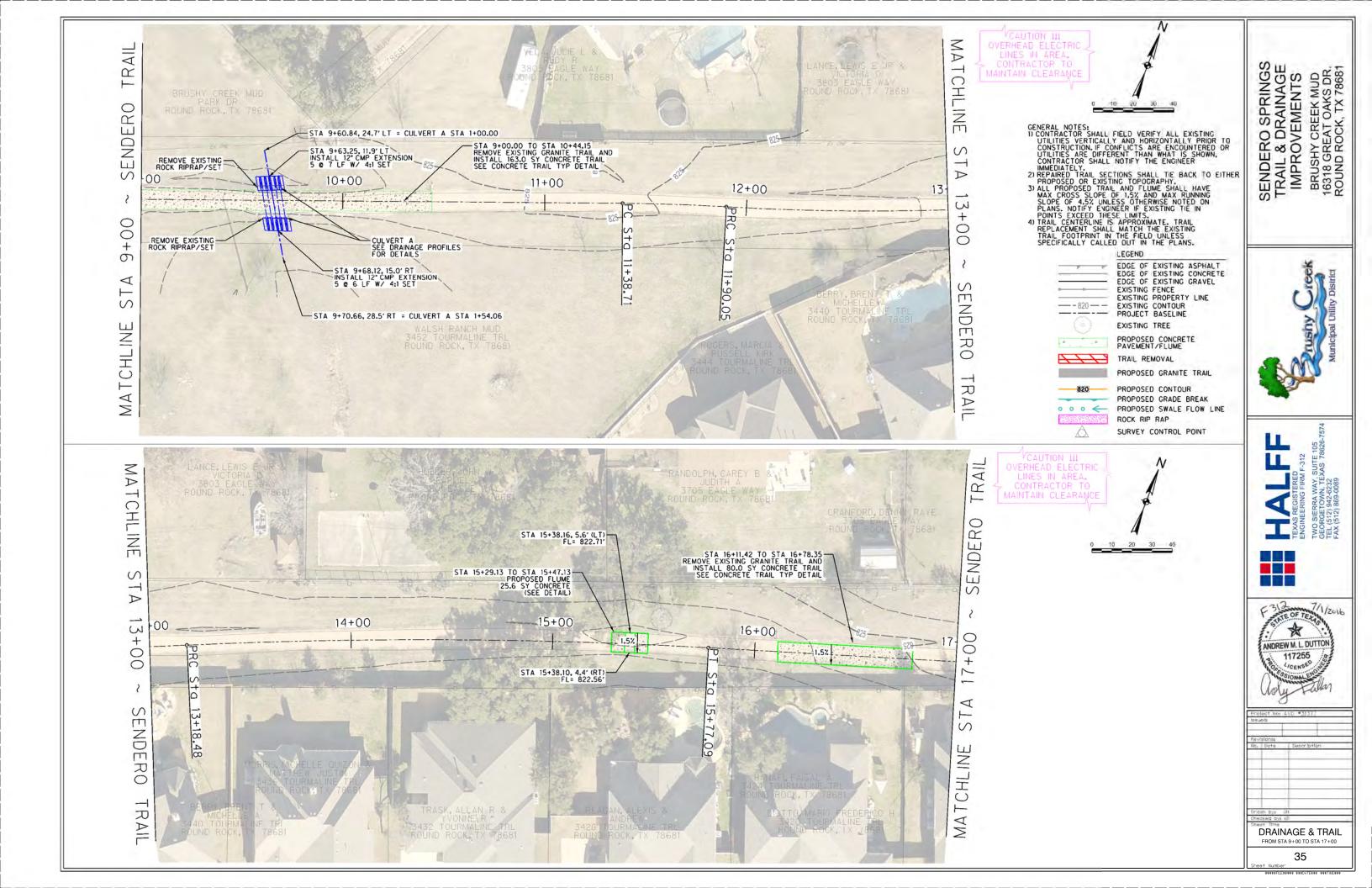


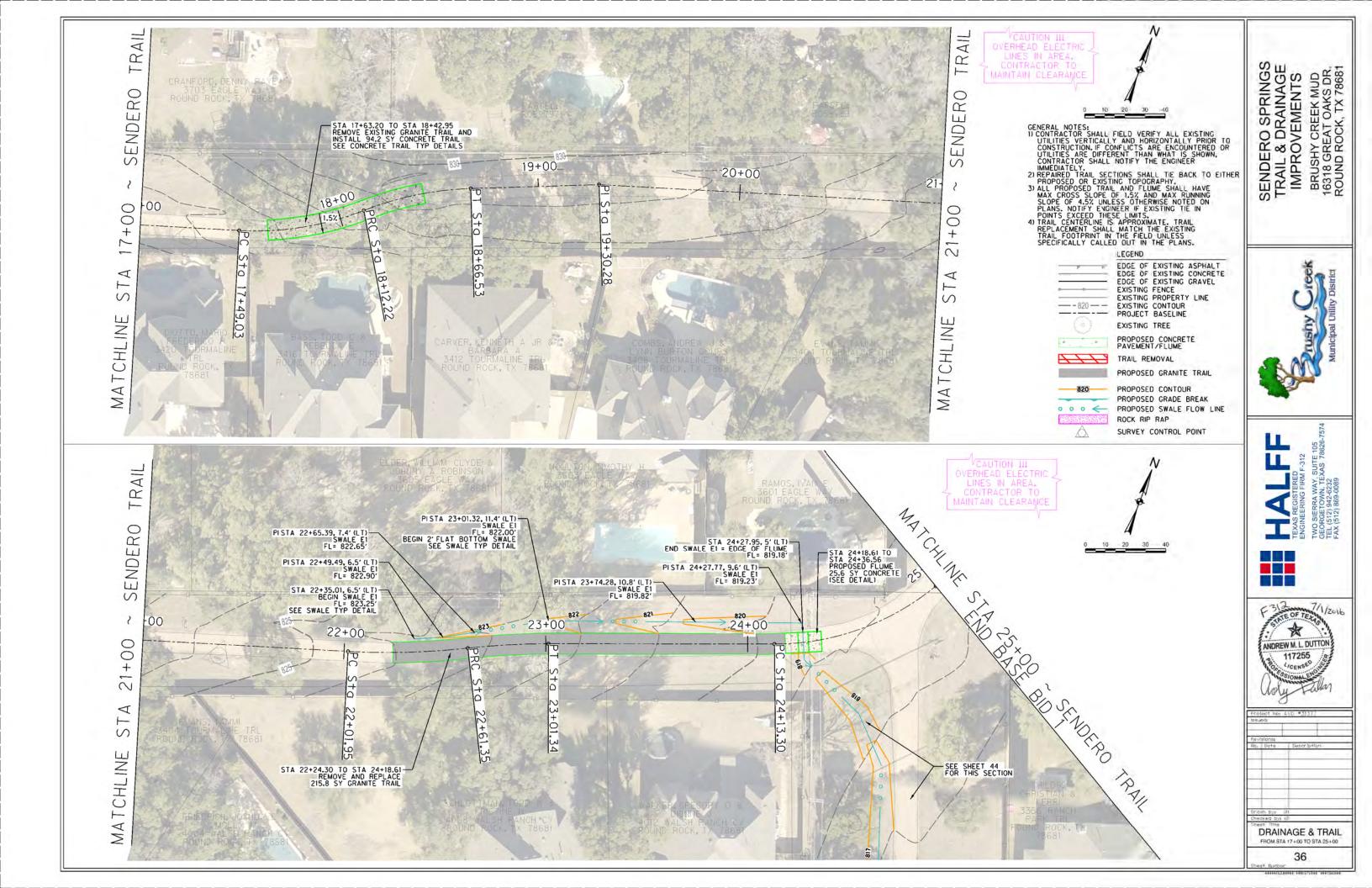


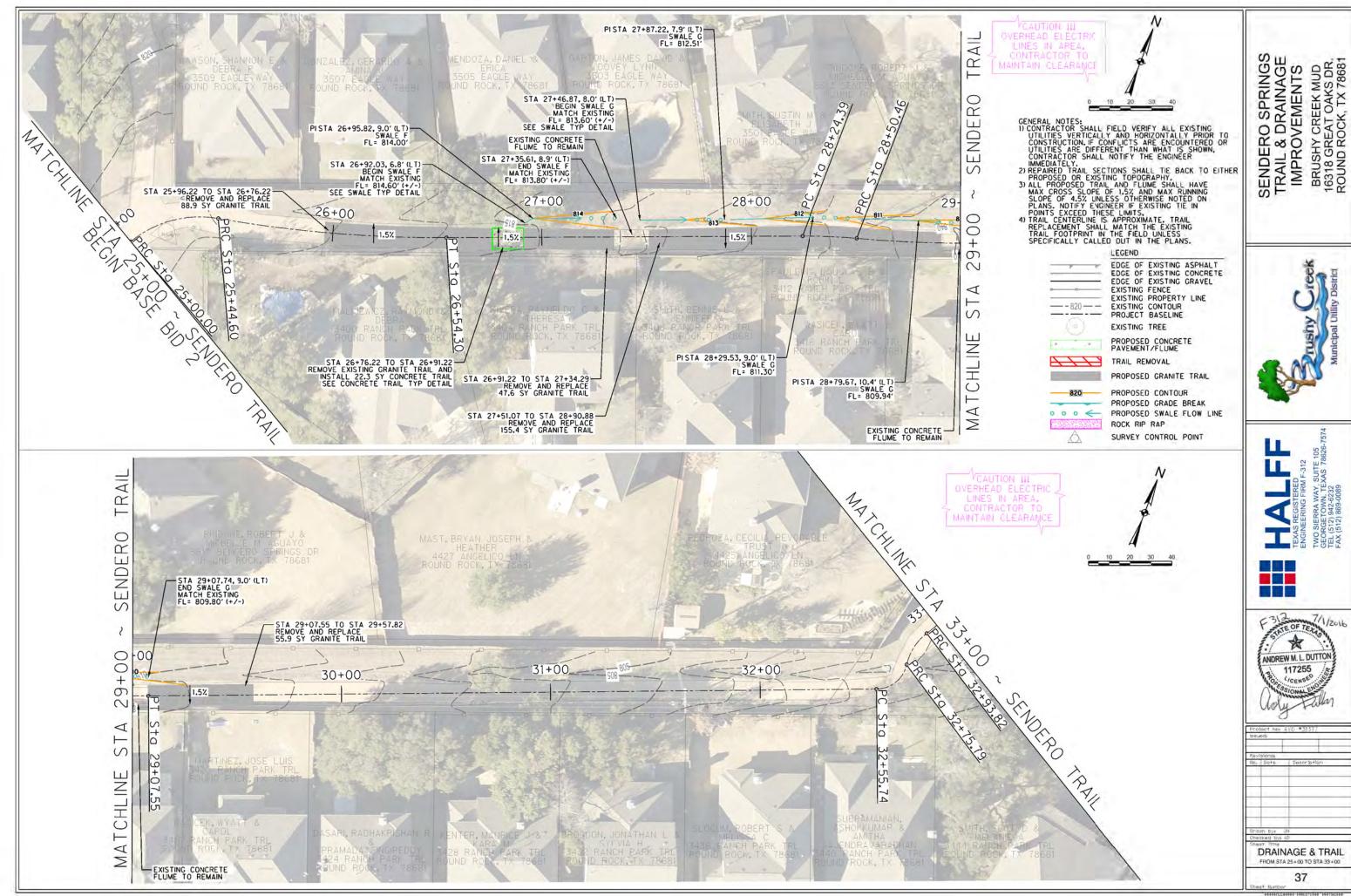


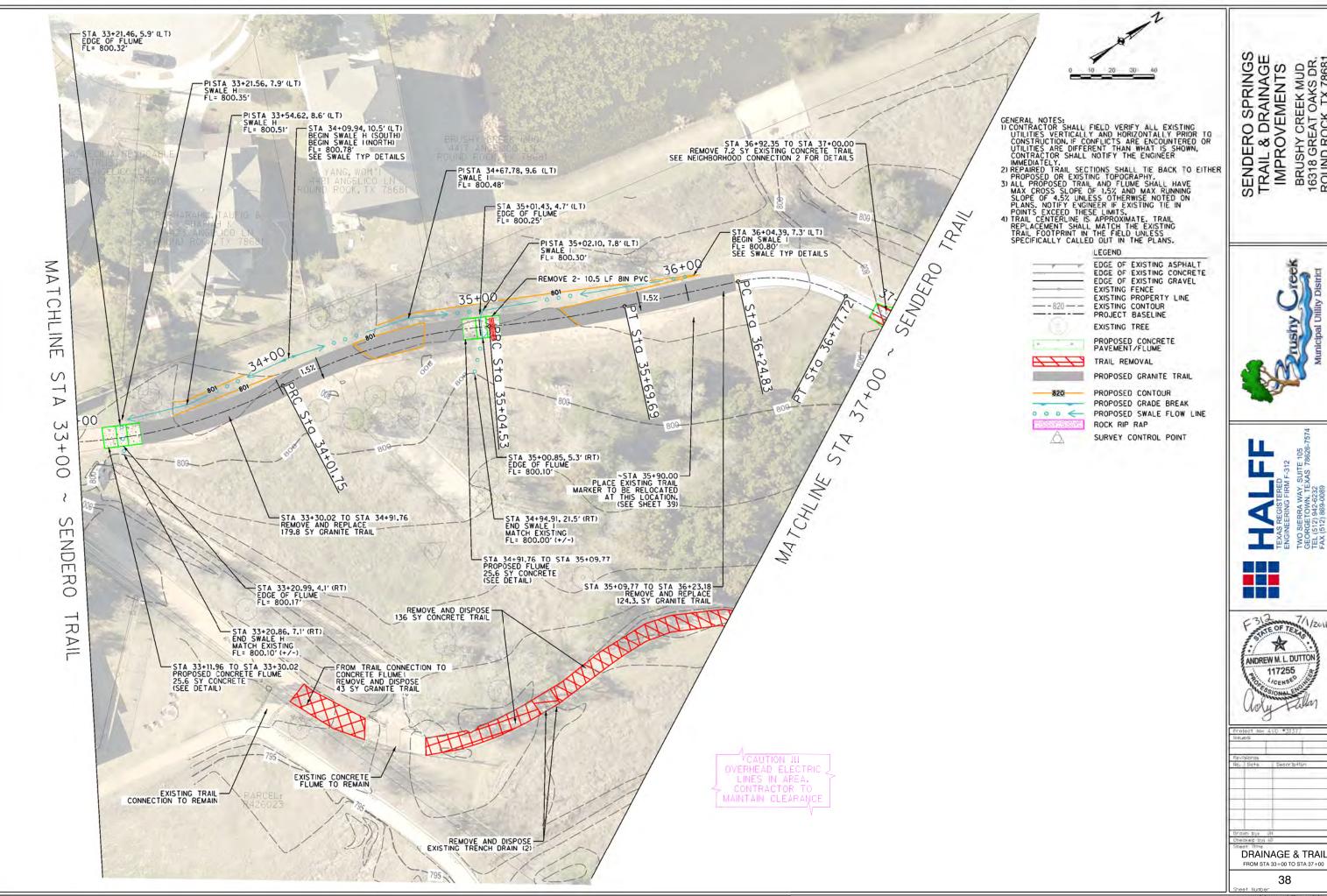
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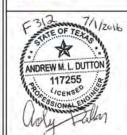






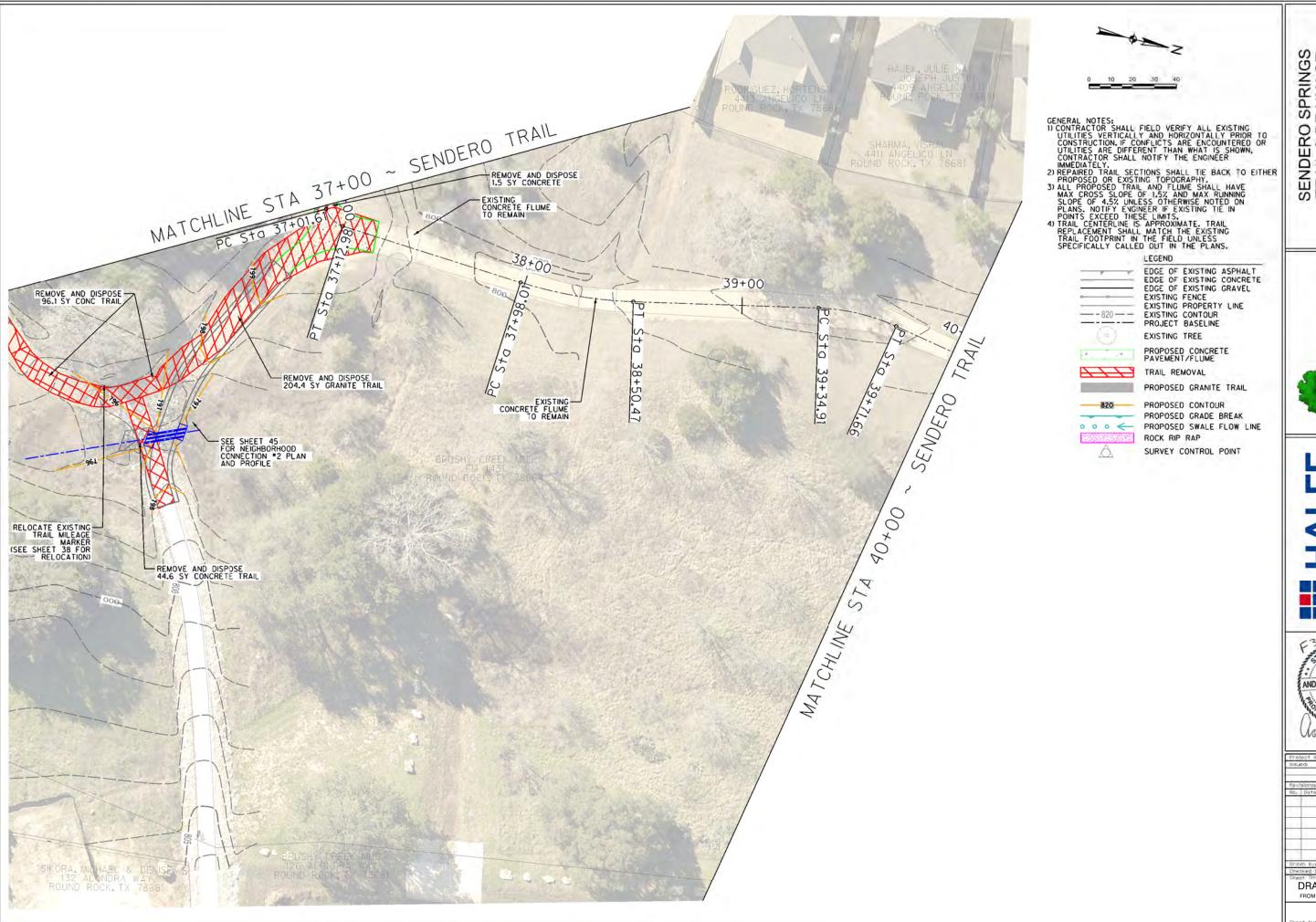






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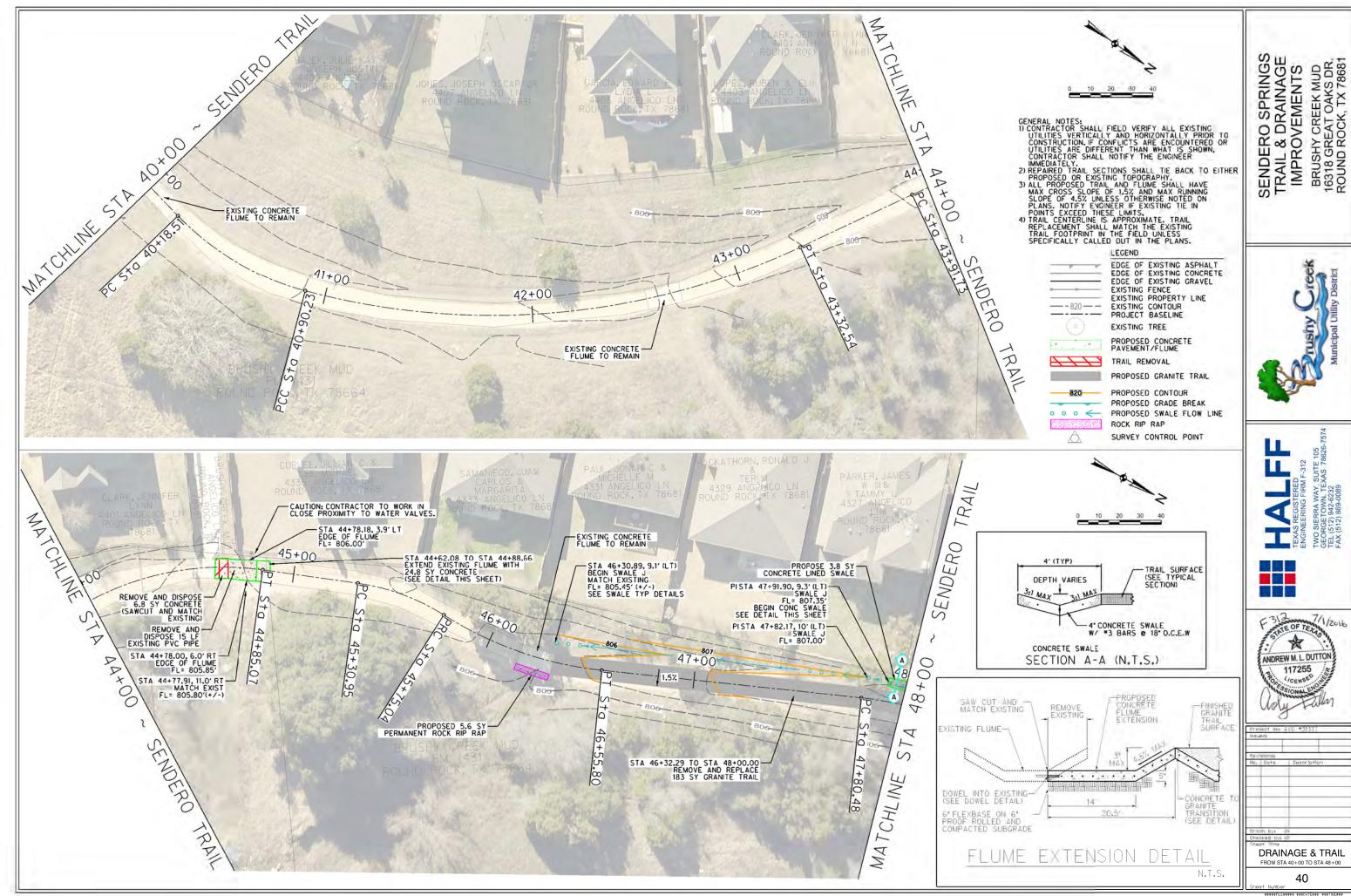


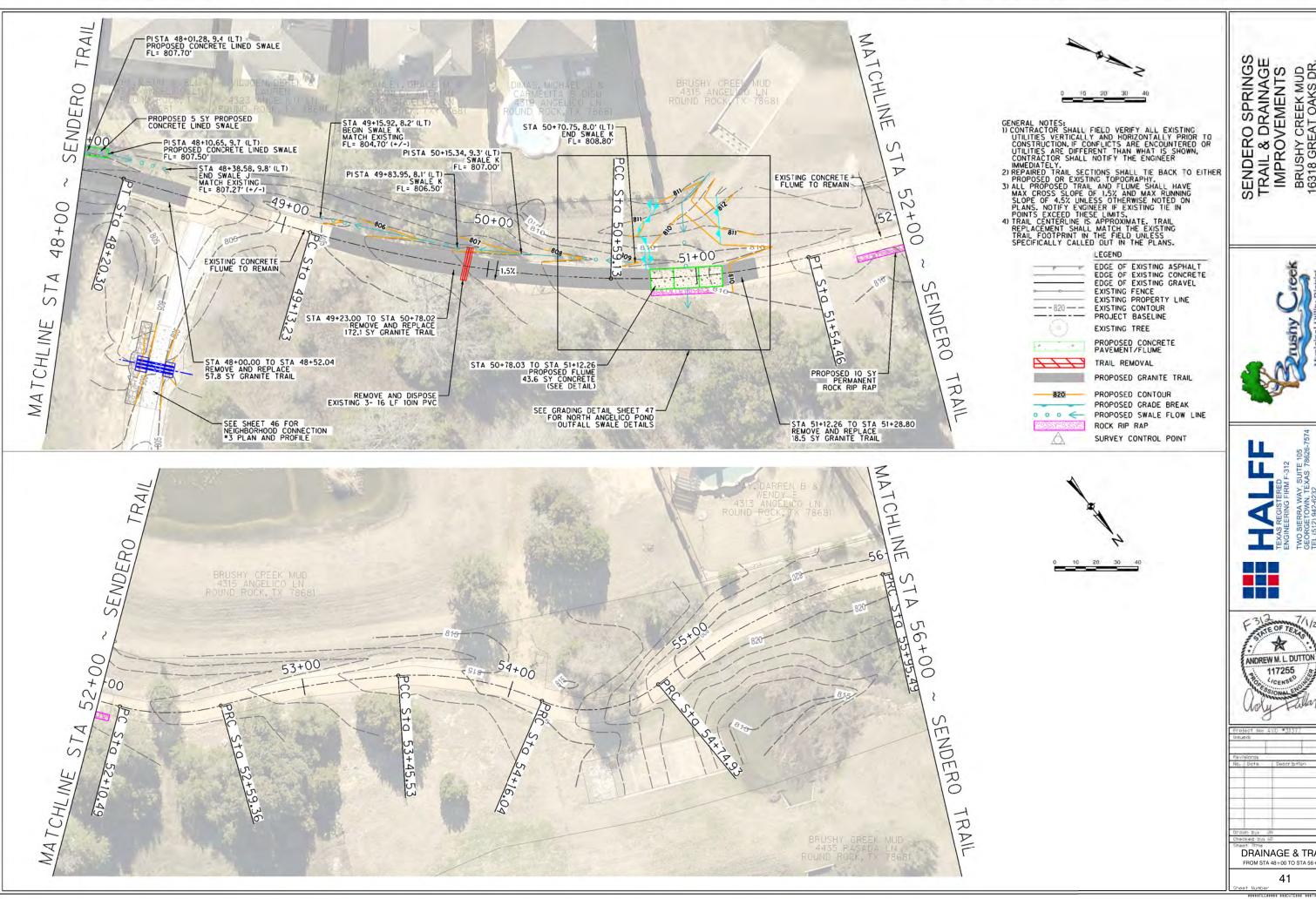
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DRAINAGE & TRAIL FROM STA 37+00 TO STA 40+00

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SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS

BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681

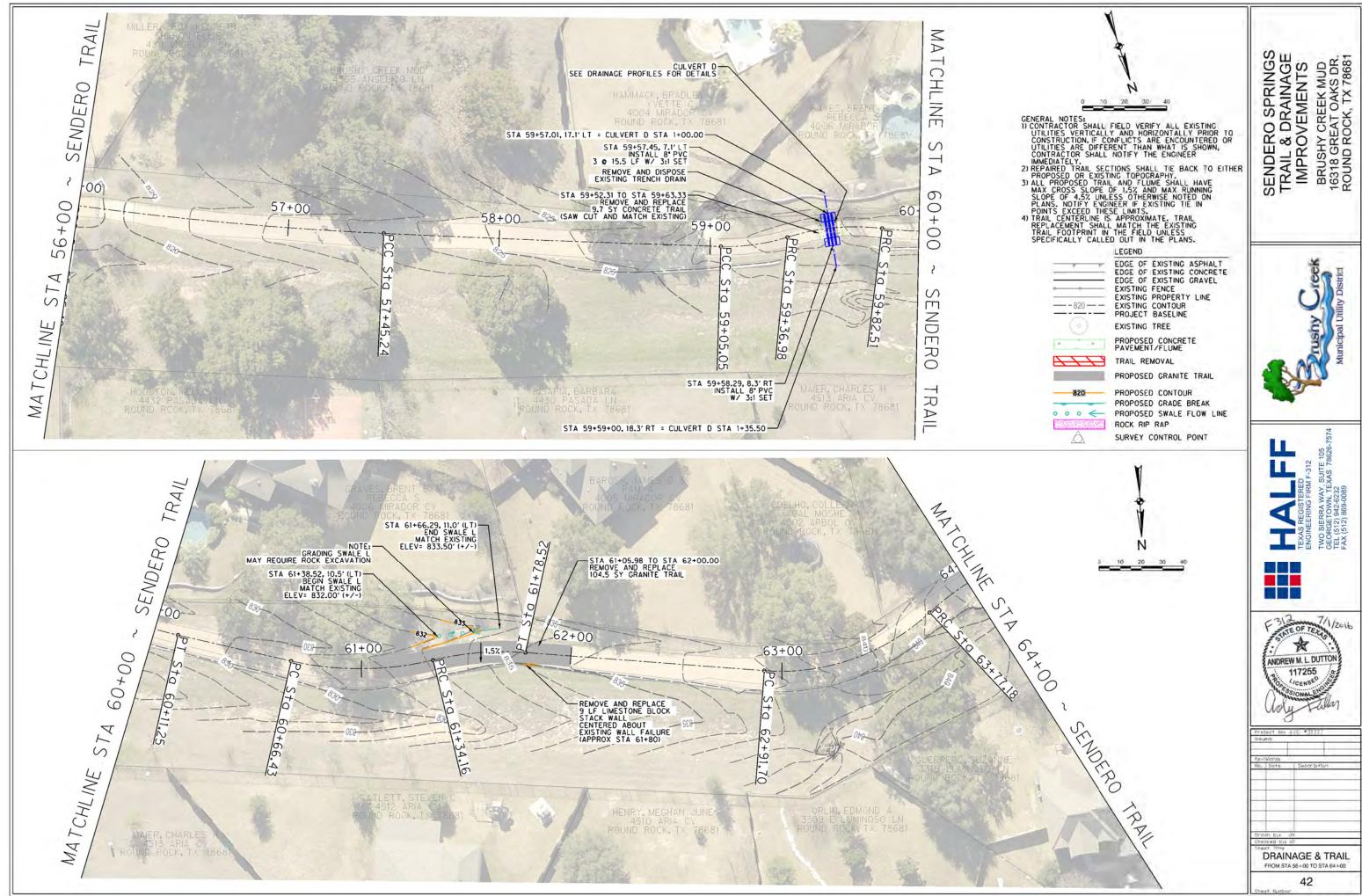
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DRAINAGE & TRAIL FROM STA 48+00 TO STA 56+00

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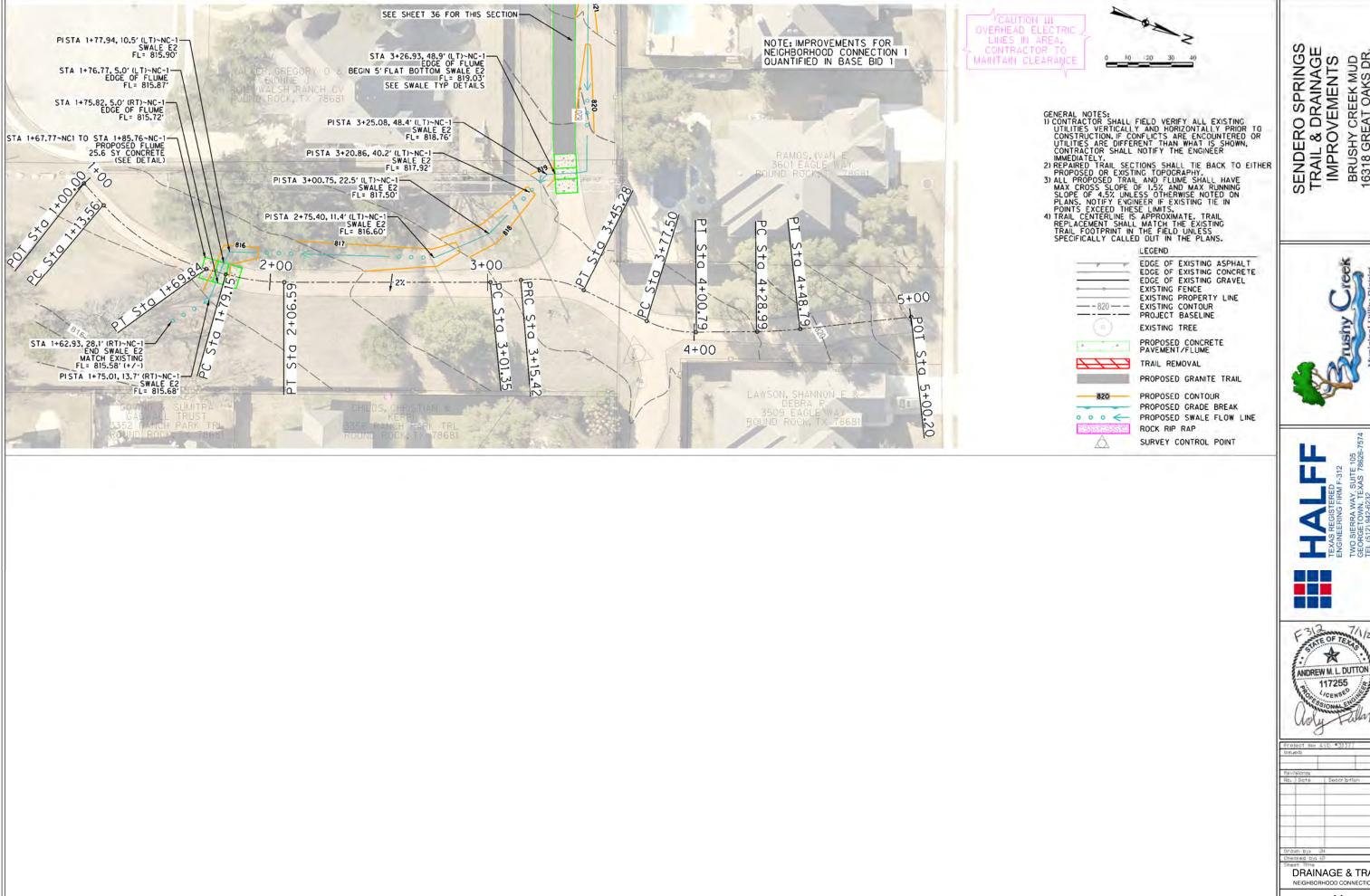








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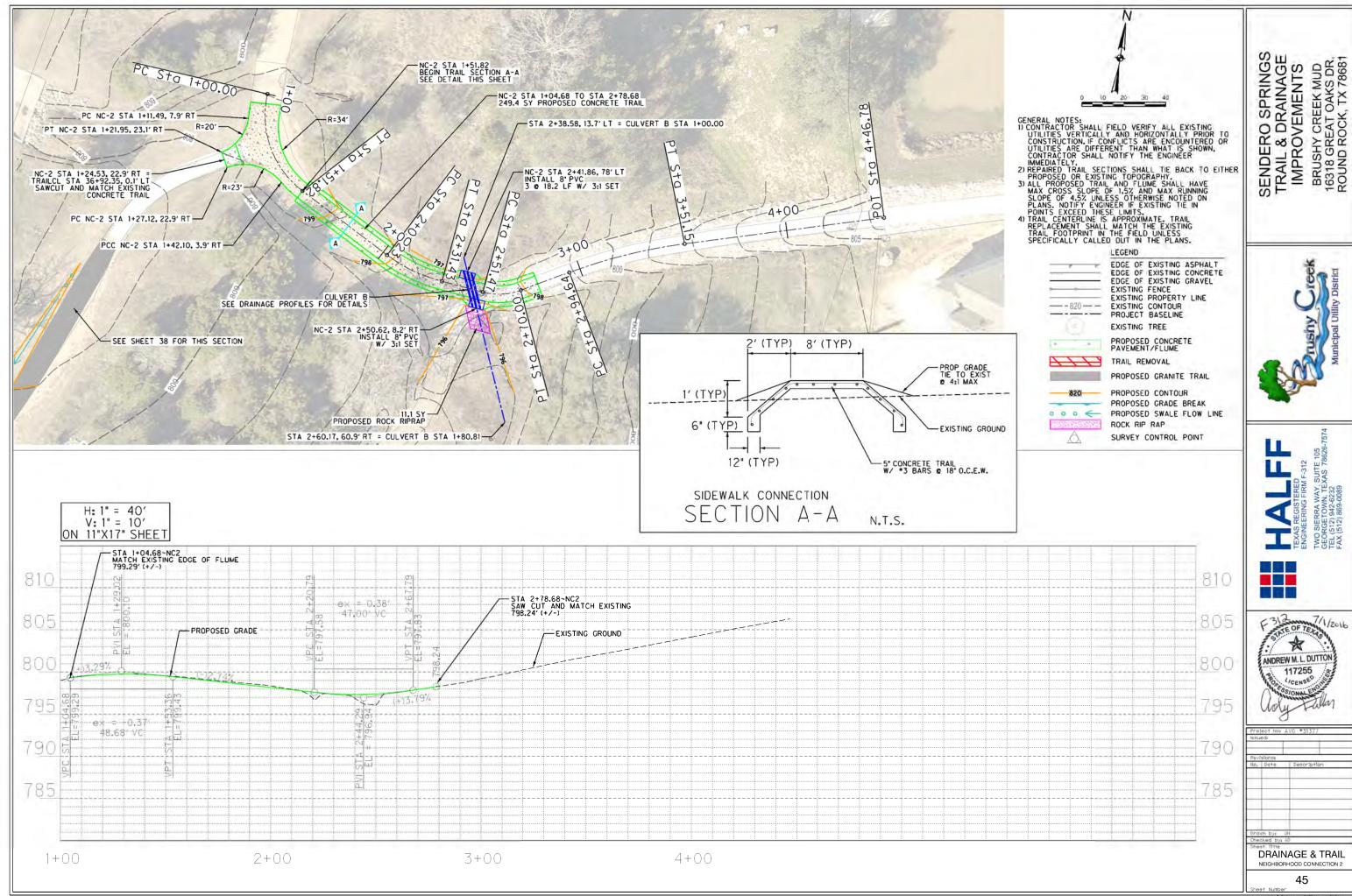


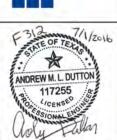


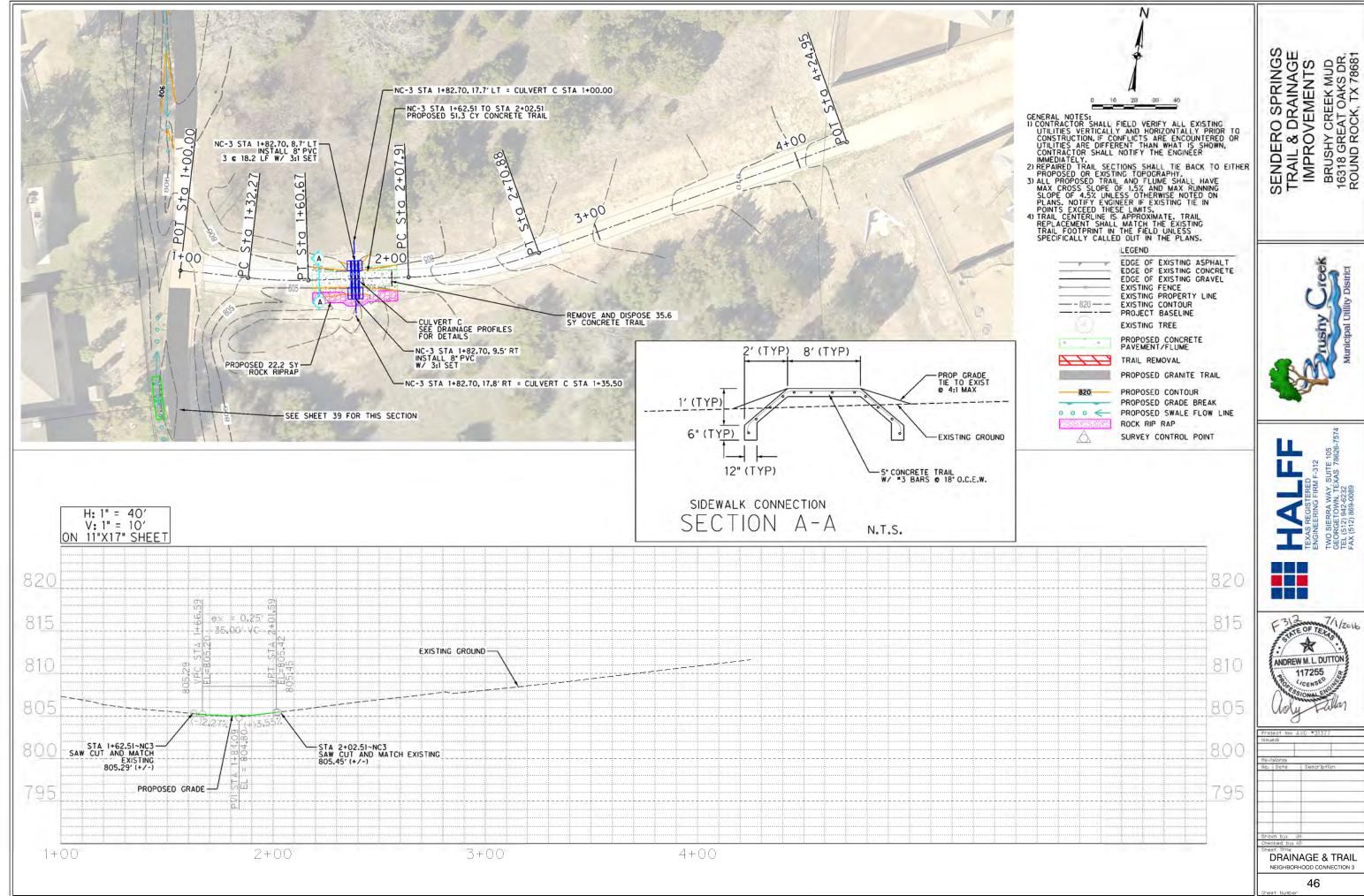
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DRAINAGE & TRAIL NEIGHBORHOOD CONNECTION 1

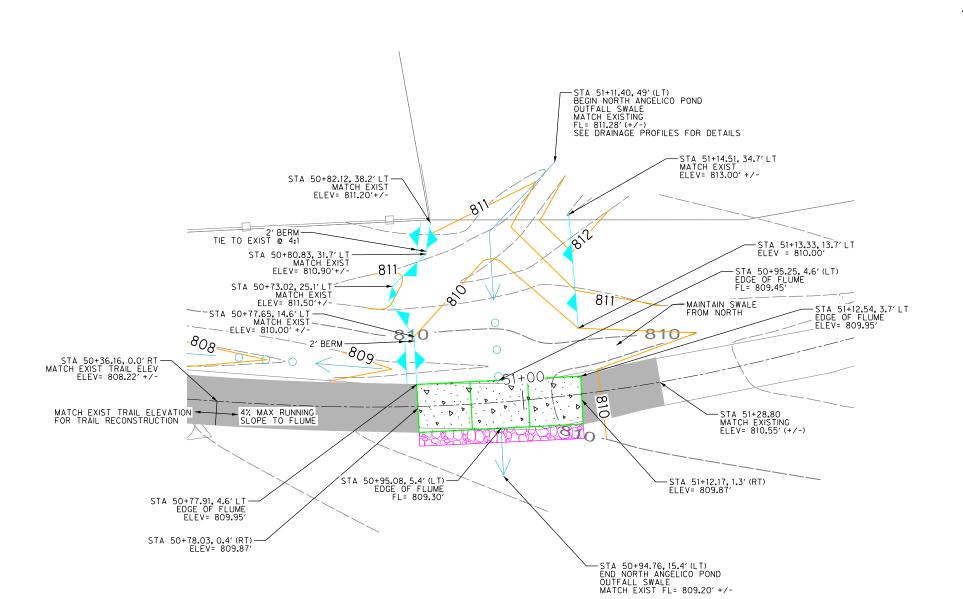


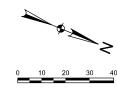






7/1/2016





GENERAL NOTES:

1) CONTRACTOR SHALL FIELD VERIFY ALL EXISTING
UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO
CONSTRUCTION. IF CONFLICTS ARE ENCOUNTERED OR
UTILITIES ARE DIFFERENT THAN WHAT IS SHOWN,
CONTRACTOR SHALL NOTIFY THE ENGINEER
IMMEDIATELY.

2) REPAIRED TRAIL SECTIONS SHALL TIE BACK TO EITHER
PROPOSED OR EXISTING TOPOGRAPHY.

3) ALL PROPOSED TRAIL AND FLUME SHALL HAVE
MAX CROSS SLOPE OF 1.5% AND MAX RUNNING
SLOPE OF 4.5% UNILESS OTHERWISE NOTED ON
PLANS. NOTIFY ENGINEER IF EXISTING TIE IN
POINTS EXCEED THESE LIMITS.

4) TRAIL CENTERLINE IS APPROXIMATE. TRAIL
REPLACEMENT SHALL MATCH THE EXISTING
TRAIL FOOTPRINT IN THE FIELD UNLESS
SPECIFICALLY CALLED OUT IN THE PLANS.

LEGEND

EDGE OF EXISTING ASPHALT EDGE OF EXISTING CONCRETE EDGE OF EXISTING GRAVEL EXISTING FENCE EXISTING PROPERTY LINE EXISTING CONTOUR PROJECT BASELINE EXISTING TREE

TRAIL REMOVAL

PROPOSED CONCRETE PAVEMENT/FLUME



PROPOSED GRANITE TRAIL



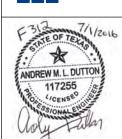
PROPOSED CONTOUR PROPOSED GRADE BREAK PROPOSED SWALE FLOW LINE ROCK RIP RAP

SURVEY CONTROL POINT



SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681

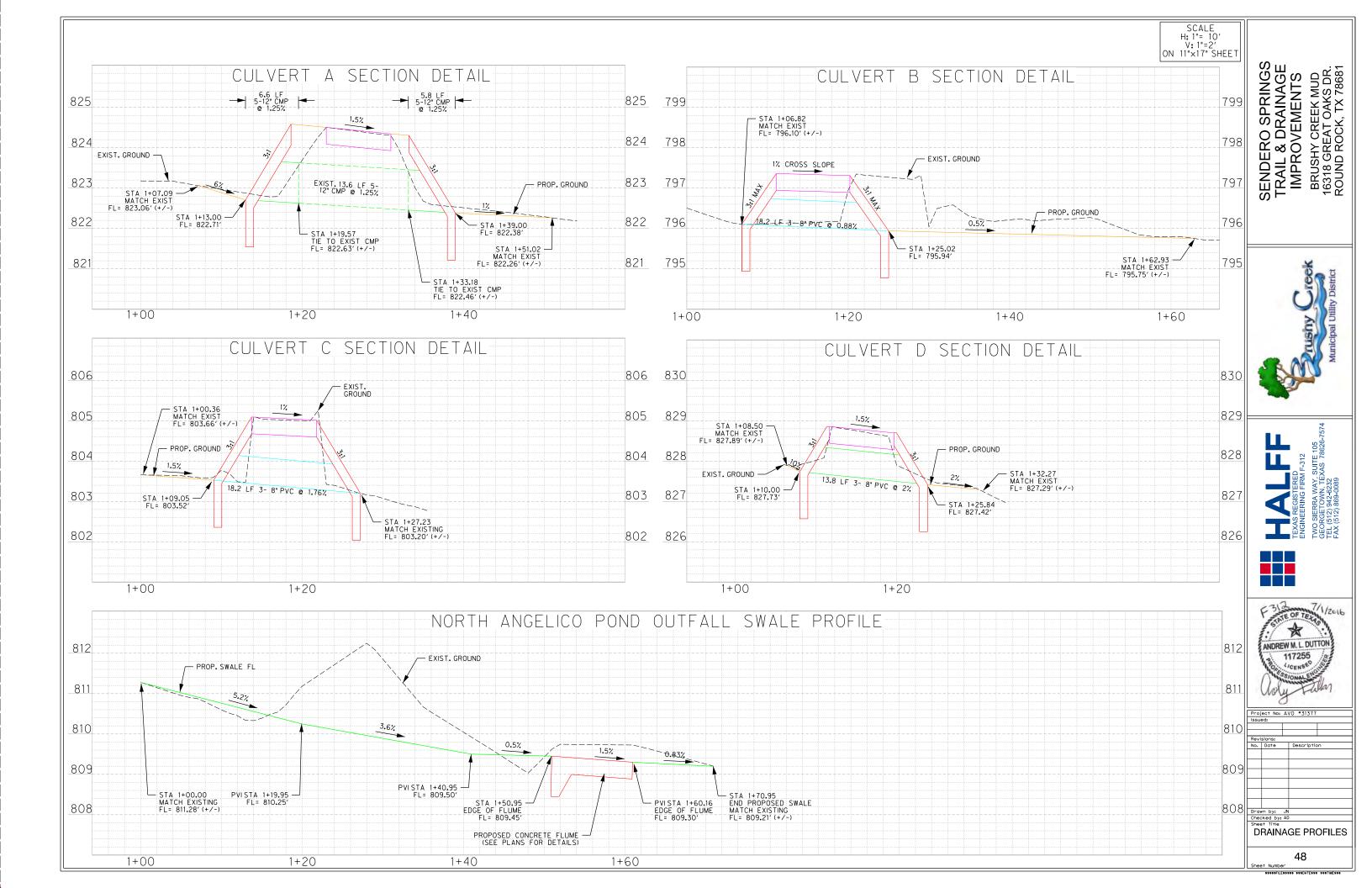


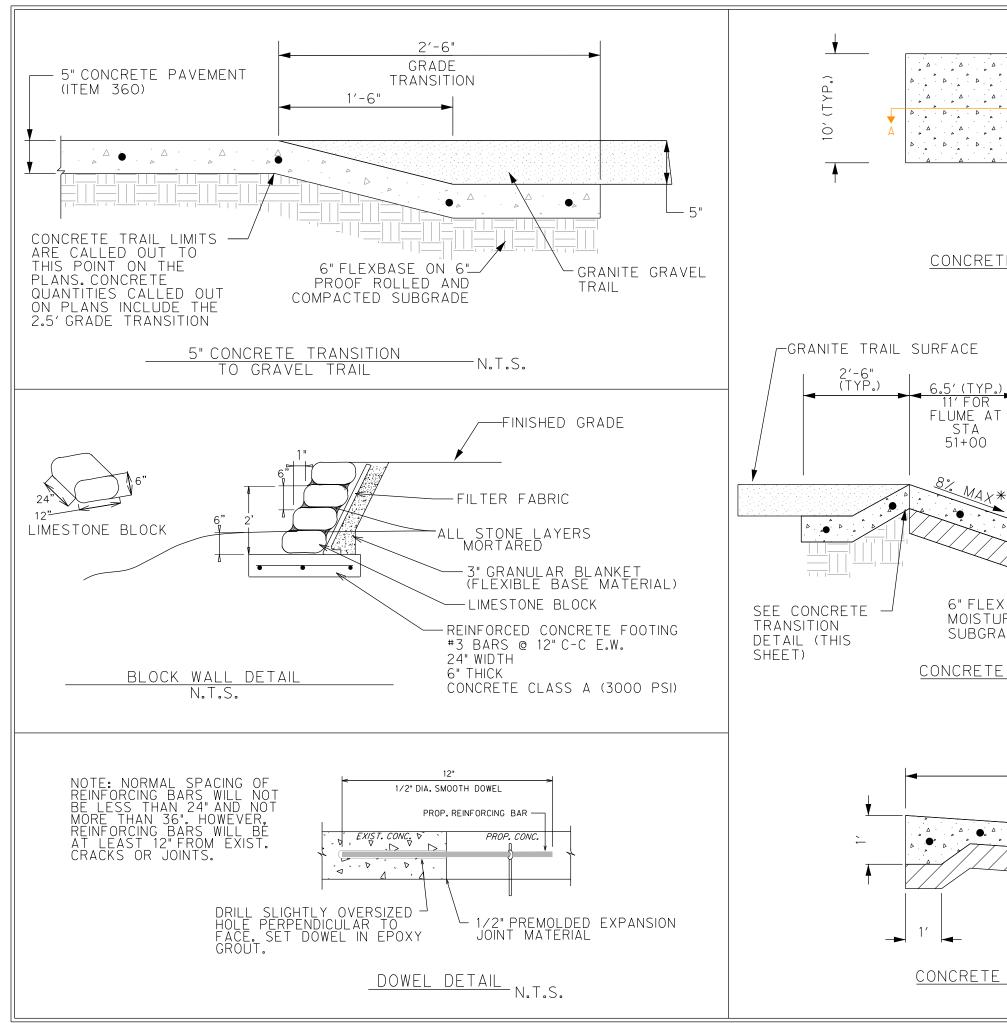


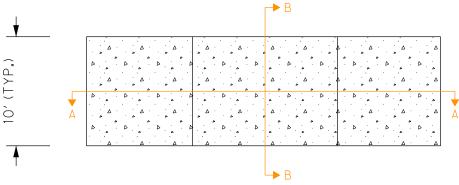
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GRADING @ NORTH ANGELICO POND OUTFALL

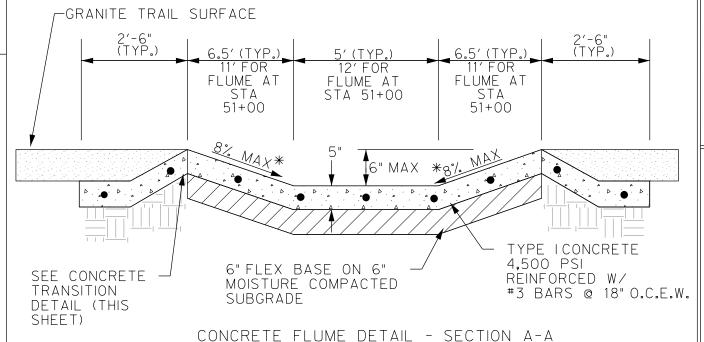
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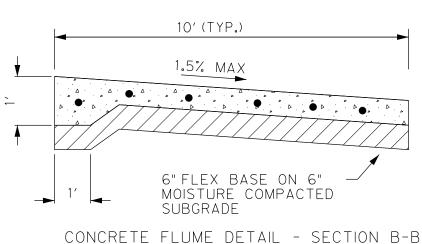
CONCRETE FLUME DETAIL- PLAN VIEW N.T.S.



N.T.S.

*4.5% MAX FOR FLUME

AT STA 51+00



ONCRETE FLUME DETAIL - SECTION B-B N.T.S. SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681





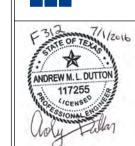


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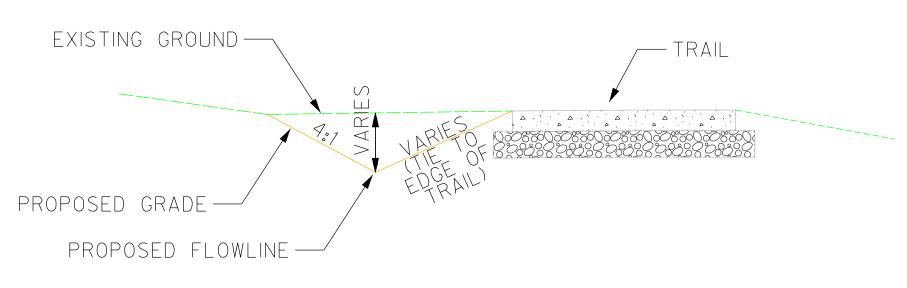




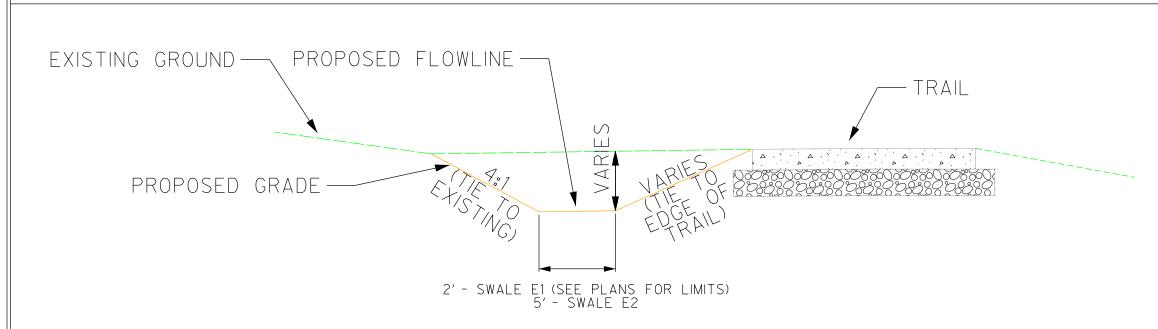


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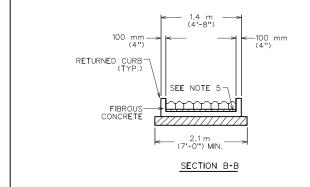
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PROPOSED TYPICAL DRAINAGE GRADE "V" CROSS SECTION N.T.S. SWALE - A, B1, B2, E1, F, G, H, I, J, K, L



PROPOSED TYPICAL DRAINAGE GRADE FLAT BOTTOM CROSS SECTION N.T.S SWALE - E1, E2



GENERAL NOTES:

1. THIS STANDARD IS APPLICABLE FOR RAMP CONSTRUCTION WITHIN RIGHT-OF-WAY OR EASEMENT ONLY.

2. PAVERS WILL HAVE DETECTABLE WARNING THAT CONSISTS OF RAISED TRUNCATED DOMES WITH A DIAMETER OF 23 mm (0.9"), A NOMINAL HEIGHT OF 5 mm (0.2") AND A NOMINAL CENTER TO CENTER SPACING OF 60 mm (2.35") AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT (Re: ADAAG SECTION 4.29.2). MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. A BASKET WEAVE PAVER PATTERN SHALL BE USED UNLESS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. PAVER PATTERN VARIES PER MANUFACTURER'S RECOMMENDATIONS. REFER TO STANDARD DETAIL 4325-5 FOR PAVER BASE PREPARATION DETAILS.

THE CURB, GUTTER AND RAMP SYSTEM SHALL BE CONFIGURED TO MAINTAIN ALL RUNOFF FROM A 25 YEAR FREQUENCY STORM WITHIN THE RIGHT-OF-WAY (DRAINAGE CRITERIA MANUAL SECTION 1.2.2.8).

TYPICAL SIDEWALK WIDTHS AND CURB RADIIARE SHOWN FOR ILLUSTRATION ONLY. REFER TO THE TRANSPORTATION CRITERIA MANUAL FOR SIDEWALK WIDTHS, CURB RADIIAND CURB BASIC REQUIREMENTS.

RADII AND CURB BASIC REQUIREMENTS.

5. THE PERMISSIBLE CONSTRUCTION JOINT BETWEEN THE PAVERS AND THE ADJOINING SURFACE SHALL BE LIMITED TO 6 mm (1/4") JOINT SIZE. GAPS LARGER THAN 6 mm (1/4") MUST BE APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. ALL JOINTS BETWEEN BRICKS AND ADJOINING SURFACE SHALL BE MORTAR FILLED UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.

5. MORTAR SHALL CONFORM TO STD. SPECIFICATION ITEM SECTION 403S.3.5. MORTAR AND GROUT. ALL OTHER CONCRETE SHALL CONFORM TO STD. SPECIFICATION ITEM 403S, CONCRETE FOR STRUCTURES, UNLESS OTHERWISE NOTED.

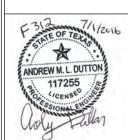
7. CURB RAMPS WITH 100 mm (4") CONCRETE VALLEY MAY ONLY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK DIAGONALLY ACROSS THE RAMP.

CITY OF AUSTIN	•	COMBINED SIDEWALK CURB RAMP WITH PAVERS		
BY BILL GARDNER		THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 4325-3F	



SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681

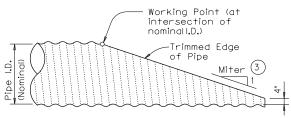




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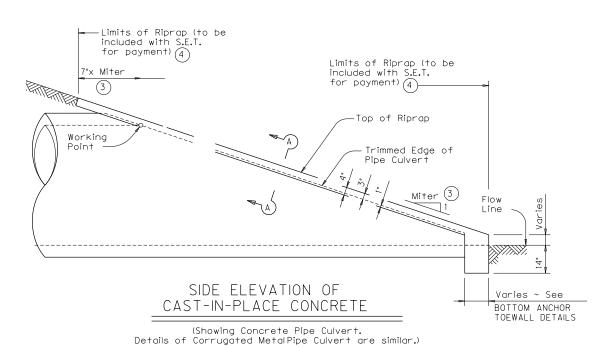
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NOTE: All Pipe Runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

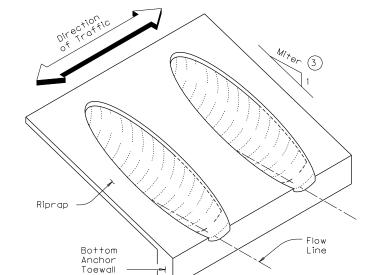
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated MetalPipe Culvert. Details of Concrete Pipe Culvert are similar.)



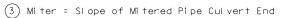
TYPICAL PIPE CULVERT MITERS 3						
Side Slope	0° Skew	15° Skew	30° Skew	45° Skew		
3:1	3:1	3.106:1	3.464:1	4.243:1		
4:1	4:1	4.141:1	4.619:1	5.657:1		
	Side Slope 3:1	Side 0° Slope Skew	Side 0° 15° Skew 3:1 3:106:1	Side 0° 15° 30° Slope Skew Skew Skew 3:1 3:1 3.106:1 3.464:1		

	ESTIMATED CONCRETE RIPRAF	QUANTITIES (CY) 5	
Nominal Culvert	3:1 Side Slope	4:1 Side Slope	
I.D.	3 BARREL	5 BARREL	
8"	0.63		
12"		1.72	



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)



(4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".

5) Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple Pipe Culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.



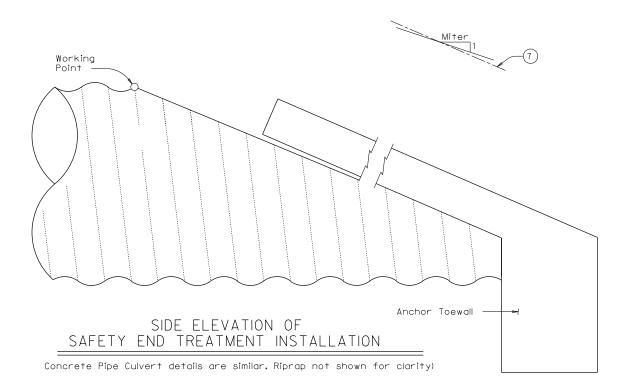
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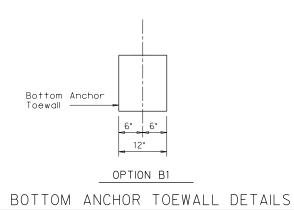
SAFETY END TREATMENT

FOR 8" DIA TO 60" DIA

PIPE CULVERTS

TYPE II ~ CROSS DRAINAGE





(Culvert & Riprap not shown for clarity)

- (4) Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- (6) Recommended values of side slope are 3:1, 4:1, & 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

GENERAL NOTES:

Riprap and allnecessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewallis included in the Price Bid for each

Safety End Treatment.
Pipe Runners, Cross Pipes, and Anchor Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API5LX52.

Bolts and nuts shall conform to ASTM A307.
All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



SHEET 2 OF 2

SAFETY END TREATMENT

FOR 8" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE